DRAFT REMEDIAL ACTION PLAN

Former Pechiney Cast Plate, Inc. Facility

3200 Fruitland Avenue

Vernon, California

Prepared for:

Pechiney Cast Plate, Inc.

Prepared by:

AMEC Environment & Infrastructure, Inc.
121 Innovation Drive, Suite 200
Irvine, CA 92617
(949) 642-0245

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This report was prepared by the staff of AMEC Environment & Infrastructure, Inc. under the supervision of the Engineer and/or Geologist whose signatures appear hereon.

The findings, recommendations, specifications, or professional opinions are presented within the limits described by the client, in accordance with generally accepted professional engineering and geologic practice. No warranty is expressed or implied.

Linda Conlan, PG
Principal Geologist

Calvin H. Hardcastle, PE
Principal Engineer

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ACRONYMS AND ABBREVIATIONS

Alcoa	Aluminum Company of America
AMEC	AMEC Environment & Infrastructure, Inc., formerly AMEC Geomatrix, Inc.
ASTM	ASTM International (formerly American Society for Testing and Materials)
BTEX	benzene, toluene, ethylbenzene, and total xylenes
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfm	cubic feet per minute
CFR	Code of Federal Regulations
cfu/gm-dw	bacteria colony forming units per gram of soil dry weight
CPT/ROST	cone penetration test/rapid optical screening test
COC	chemical of concern
COPC	chemical of potential concern
Cr (VI)	hexavalent chromium
DAF20	dilution attenuation factor of 20
1,2-DCA	1,2-dichloroethane
1,1-DCE	1,1- dichloroethene
DO	dissolved oxygen
DTSC	Department of Toxic Substances Control
ESA	Environmental Site Assessment
FS	Feasibility Study
Geomatrix	Geomatrix Consultants, Inc.
H&EC	City of Vernon Health & Environmental Control
HASP	Health and Safety Plan
HHRA	Human Health Risk Assessment
HI	hazard index

HQ	hazard quotient
ISR	in situ respiration
ISS	in situ stabilization
MCL	maximum contaminant level
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/kg/year	milligrams per kilogram per year
MNA	monitored natural attenuation
NCP	National Contingency Plan
O&M	operation and maintenance
OEC	other environmental condition
OEHHA	Office of Environmental Health Hazard Assessment
Order	Imminent and Substantial Endangerment Determination and Consent Order
ORP	oxidation-reduction potential
PCB	polychlorinated biphenyl
PCBNP	Polychlorinated Biphenyl Notification Plan
PCE	tetrachloroethene
Pechiney	Pechiney Cast Plate, Inc.
PID	photoionization detector
PPE	personal protective equipment
PRG	preliminary remediation goal
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
RAP	Remedial Action Plan
ROI	radius of influence
RBSL	risk-based screening level

REC	recognized environmental condition
RWQCB	California Regional Water Quality Control Board, Los Angeles Region
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
SEC	specific electrical conductance
Site	former Pechiney Cast Plate, Inc. facility, 3200 Fruitland Avenue, Vernon, California
SSL	soil screening level
SMP	Soil Management Plan
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
SWPPP	Storm Water Pollution Prevention Plan
TCE	trichloroethene
TEPH	total extractable petroleum hydrocarbons
TMB	trimethylbenzene
TPH	total petroleum hydrocarbons
1,1,1-TCA	1,1,1-trichloroethane
TSCA	Toxic Substances Control Act
TVPH	total volatile petroleum hydrocarbons
URS	URS Corporation
U.S. EPA	United States Environmental Protection Agency
UST	underground storage tank
vGAC	vapor-phase granular activated carbon
Vernon Facility	former Pechiney Cast Plate, Inc. facility, 3200 Fruitland Avenue, Vernon, California
VOC	volatile organic compound

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EXECUTIVE SUMMARY

AMEC Environment & Infrastructure, Inc. (formerly Geomatrix, Inc. and AMEC Geomatrix Inc. [AMEC]), has prepared this Remedial Action Plan (RAP) on behalf of Pechiney Cast Plate, Inc. (Pechiney), for the former Pechiney facility (Vernon Facility or Site) located at 3200 Fruitland Avenue in Vernon, California (Figure 1).

Introduction and Purpose

Based on the information provided in the Feasibility Study (FS; AMEC, 2012a), this RAP was prepared in accordance with Department of Toxic Substances Control (DTSC) guidance and policy for RAP development (DTSC policy #EO-95-007-PP), and pursuant to Health and Safety Code section 25356.1. This RAP provides the details and procedures for remediating polychlorinated biphenyl (PCB)-impacted concrete during demolition of below-grade features, and remediating impacted soil and soil vapor during and following below-grade demolition. On July 6, 2010, DTSC issued an Imminent and Substantial Endangerment Determination and Consent Order (Order; DTSC, 2010) for the Site. DTSC has the final approval authority for the implementation of this Site-wide RAP. However, pursuant to the Code of Federal Regulations (CFR), Title 40, Subchapter R, Toxic Substances Control Act, Part 761 (40 CFR 761), the United States Environmental Protection Agency (U.S. EPA) has approval authority for risk-based remediation of PCB releases and disposal of PCB remediation waste (soil and concrete). Pechiney will implement the RAP pursuant to the Order, and subject to DTSC's approval of the RAP and U.S. EPA approval of the PCB risk-based application referred to as the Polychlorinated Biphenyls Notification Plan (PCBNP) (AMEC, 2009) for the Site. On July 2, 2010, U.S. EPA issued a conditional approval letter regarding the PCBNP, which outlined requirements for additional PCB sampling and submission of additional information. In the conditional approval letter, U.S. EPA also deferred the approval of the PCB remediation goals until the additional PCB sampling results and information was submitted to U.S. EPA. The results of the additional sampling were submitted to U.S. EPA for review on December 29, 2010. U.S. EPA's conditional approval of the PCB remediation goals was granted on July 1, 2011.

This RAP was revised to address additional comments made by DTSC to the September 2009 draft RAP, and additional requirements imposed by U.S. EPA regarding PCBs.

Site History

The Site is comprised of approximately 26.9 acres and was formerly occupied by approximately 600,000 square feet of building area. Manufacturing operations at the Site began in approximately 1937 and included production of high-precision cast aluminum plates. As part of their manufacturing operations, Aluminum Company of America (Alcoa; original Site owner) used fuels and Stoddard solvent, both of which were stored in underground storage tanks. Stoddard solvent was used during the aluminum manufacturing process. Alcoa also operated processes that required lubricating and hydraulic oils and generated hazardous waste that was stored at various locations throughout the Site.

In 1998, Alcoa sold the western portion of the facility (3200 Fruitland Avenue) to Century Aluminum Company. In 1999, Pechiney purchased the Site, and subsequently closed the Vernon facility in January 2006.

Previous Investigations, Chemicals of Concern, and Removal Actions

Previous remedial investigations were conducted at the Site for soil, soil vapor, groundwater, and building materials. During these investigations, chemicals of concern (COCs) were identified at the Site as described below.

- Soil impacted with petroleum hydrocarbons (including Stoddard solvent compounds), metals, PCBs, and volatile organic compounds (VOCs).
- Soil vapor impacted with Stoddard solvent compounds and VOCs.
- Groundwater (at a depth of 150 feet) impacted with chlorinated VOCs.
- Building concrete slabs impacted with PCBs.

Prior to 1999, Alcoa investigated subsurface conditions and conducted limited remediation in both the eastern and western portions of its facility as part of their efforts to seek closure of its City of Vernon Health & Environmental Control hazardous materials permit. Alcoa's activities are described in Section 3.0 of this document.

As part of the aboveground demolition work completed in November 2006 by Pechiney, the above-ground features, including the former manufacturing facilities, were demolished leaving the concrete floor slab in place; and the debris was transported off-site for disposal or recycling.

Summary of Site Risks

The preferred remedial alternatives discussed in this RAP focus on mitigating principal risk threats posed by remaining PCB-impacted concrete, surface and shallow COC-impacted soil, deeper soil impacted by Stoddard solvent, and deeper soil impacted by VOCs. Implementation of the RAP will reduce the potential for risks to human health due to exposure to shallow soil containing COCs, and reduce the potential impacts to groundwater from exposure to deeper COC-impacted soil.

The RAP also provides materials management practices that will be implemented during below-grade demolition, and handling of non-COC-impacted concrete and soil at the Site.

Remedy Evaluation Process

The Health and Safety Code section 25356.1(d) requires that remedy evaluations be based on requirements contained in the National Contingency Plan (NCP), 40 CFR 300.430. The NCP identifies evaluation criteria (also known as balancing or evaluation criteria) to be used in the development and scoping of remedial alternatives to provide a basis for comparison using additional, more detailed criteria, referred to as evaluation criteria. The criteria include those developed by the U.S. EPA in NCP 40 CFR 300.430(a)(1)(iii) and as modified by the State of California. All nine balancing criteria (including Threshold Criteria, Primary Balancing Criteria, and Modifying Criteria) are evaluated in the FS and described in this RAP.

The following technologies were previously evaluated in the FS and retained for additional detailed evaluation.

- No action.
- Excavation and removal followed by landfill disposal for surface and shallow COC-impacted soil and deep VOC-impacted soil.
- In situ stabilization of shallow metals-, Stoddard solvent-, and PCB-impacted soil.
- Soil vapor extraction (SVE) for shallow and deep VOC-impacted soil.
- SVE and bioventing for shallow and deep Stoddard solvent-impacted soil.
- Demolition and off-site disposal of PCB-impacted concrete.

These technologies were combined in the FS into potential alternatives considered for mitigating COC-impacted areas at the Site, which are discussed further in Section 6.2 of this document.

Alternatives Considered

The alternatives evaluated in the FS are presented below.

Alternative 1

Alternative 1 defined as “No Action” is included for evaluation pursuant to NCP 40 CFR 300.430(e)(6) and retained for comparison purposes. In this alternative, no below-grade demolition or soil remediation would be performed. Based on the findings described in the FS, a “No Action” alternative is not acceptable for this Site.

Alternative 2

Alternative 2 consists of excavation and off-site disposal of both shallow and deep COC-impacted soil (metals, PCBs, Stoddard solvent, and VOCs) to depths of approximately 8 feet below ground surface (bgs) for metals, 12 feet bgs for PCBs, and 45 to 50 feet bgs for VOCs and Stoddard solvent, respectively. Excavation will require installation of shoring for sidewall stability and safety during soil removal. Vadose zone VOC remediation will promote a reduction in VOC concentrations in groundwater beneath the northern portion of the Site. This alternative also consists of demolition and landfill disposal of PCB-impacted concrete slabs containing PCB concentrations greater than 3.5 milligrams per kilogram (mg/kg). In addition, PCB-impacted concrete (greater than 1.0 mg/kg and less than 3.5 mg/kg) would be crushed and deposited on-Site as restricted fill material (i.e., on-Site disposal) and covered with an interim cap consisting of a visual identifier layer and a minimum of 12 inches of clean, crushed concrete (unrestricted fill material). Non-PCB-impacted concrete (less than or equal to 1.0 mg/kg) would be crushed and reused on-Site as unrestricted fill material. A land use covenant that incorporates an operation and maintenance (O&M) plan and soil management plan would also be included in this alternative.

Alternative 3

Alternative 3 consists of excavation and off-site disposal of shallow COC-impacted soil (PCBs and metals) to depths of approximately 15 feet bgs. Shallow (up to 50 feet bgs) and deep (up to 90 feet bgs) VOC-impacted soil would be mitigated using SVE. Shallow (up to 50 feet bgs) Stoddard solvent-impacted soil would be mitigated using sequential treatment consisting initially of SVE, followed by longer term bioventing. Vadose zone VOC remediation will promote a reduction in VOC concentrations in groundwater beneath the northern portion of the

Site. Deeper soils (at depths greater than 15 feet) impacted with PCBs above the remediation goal would be left in place and covered with a physical barrier at depth. The physical barrier would consist of 6 inches of cement concrete. This alternative also consists of demolition and landfill disposal of PCB-impacted concrete slabs containing PCB concentrations greater than 3.5 mg/kg. In addition, PCB-impacted concrete (greater than 1.0 mg/kg and less than 3.5 mg/kg) would be crushed and deposited on-Site as restricted fill material (i.e., on-Site disposal) and covered with an interim cap consisting of a visual identifier layer and a minimum of 12 inches of clean, crushed concrete (unrestricted fill material). Non-PCB-impacted concrete (less than or equal to 1.0 mg/kg) would be crushed and reused on-Site as unrestricted fill material. A land use covenant that incorporates an O&M plan and soil management plan (SMP) would also be included in this alternative.

Alternative 4

Alternative 4 consists of in situ stabilization of shallow PCB- and metals-impacted soil and deep Stoddard solvent-impacted soil, using a cement-based additive to depths of approximately 15 feet bgs for PCB- and metals-impacted soil and approximately 50 feet for Stoddard solvent-impacted soil. Shallow (up to 50 feet bgs) and deep (up to 90 feet bgs) VOC-impacted soil would be mitigated using SVE. Vadose zone VOC remediation will promote a reduction in VOC concentrations in groundwater beneath the northern portion of the Site. This alternative also consists of demolition and landfill disposal of PCB-impacted concrete slabs containing PCB concentrations greater than 3.5 mg/kg. PCB-impacted concrete (greater than 1.0 mg/kg and less than 3.5 mg/kg) would be crushed and deposited on-Site as restricted fill material (i.e., on-Site disposal) and covered with an interim cap consisting of a visual identifier layer and a minimum of 12 inches of clean, crushed concrete (unrestricted fill material). Non-PCB-impacted concrete (less than or equal to 1.0 mg/kg) would be crushed and reused on-Site as unrestricted fill material. A land use covenant that incorporates an O&M plan and SMP would also be included in this alternative.

Preferred Remedial Alternative

Alternative 3 was selected as the preferred remedial alternative because Alternative 3 meets the balancing criteria discussed above, as required by Health and Safety Code Section 25356.1(d) and the NCP, and will not require extensive soil excavation and off-site disposal, and COC-impacted soil will be mitigated to reduce COC concentrations to levels below risk-based remediation goals. Alternative 3 is preferred over Alternative 2 because Alternative 3 provides a reduction of toxicity, mobility, and volume of COC-impacted soil by treatment compared to landfill disposal. Alternative 3 is preferred over Alternative 4 because Alternative

3 will reduce the toxicity, mobility, and volume of COC-impacted soil to a greater extent than Alternative 4. Alternative 3 consists of limited soil excavation and disposal and SVE and bioventing in a balanced mitigation strategy that is cost-effective, minimally invasive, less disruptive to the local community, and protective of human health and the environment. The preferred alternative also includes a land use covenant that incorporates an O&M plan and SMP.

Community Involvement

The objective of the community involvement program is to inform the community of the progress of demolition and remediation work and to effectively respond to health, environment, and safety concerns and questions. The community involvement program will be consistent with the Comprehensive Environmental Response, Compensation and Liability Act as implemented by the NCP 40 CFR 300.430(c)(1). The purpose of the community involvement plan as stated by the NCP 40 CFR 300.430(c)(2)(ii)(A), is to "ensure the public appropriate opportunities for involvement in a wide variety of Site-related decisions, including Site analysis and characterization, alternatives analysis, and selection of remedy; and to determine, based on community interviews, appropriate activities to ensure such public involvement."

Objectives of the community involvement program include:

- soliciting input from the community on concerns regarding the remedial activities;
- establishing effective communication between the community, Pechiney, and DTSC;
- informing the community about progress of the remedial activities; and
- providing opportunities for the community to participate and comment on the proposed remedial activities.

Prior to implementation of the RAP, DTSC will expand its outreach and distribute an information fact sheet to businesses and residents surrounding the Site and to other interested stakeholders. This fact sheet will include information about the Site, remedial activities, and project contacts. Additionally, a local information repository will be established to make documents and other information available to the public and a Site mailing list will be developed.

This RAP will be made available to the public for a comment period of at least 30 days. DTSC will respond to any comments received during the public comment period and will provide a timely opportunity for the public to access documents.

Depending on the level of community response and level of interest, DTSC may hold a community meeting to discuss the components of the RAP, the Site's history, and proposed remedial work. The meeting may also provide the opportunity for the public to submit comments regarding the RAP. DTSC will work with the community to develop a meeting format that suits the community's needs.

DRAFT REMEDIAL ACTION PLAN

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Vernon, California

1.0 REMEDIAL ACTION PLAN

AMEC Environment & Infrastructure, Inc. (formerly AMEC Geomatrix, Inc. [AMEC]), has prepared this Remedial Action Plan (RAP) on behalf of Pechiney Cast Plate, Inc. (Pechiney) for the former Pechiney facility (Vernon Facility or Site) located at 3200 Fruitland Avenue in Vernon, California (Figure 1).

A Feasibility Study (FS; AMEC, 2012a) has been prepared on behalf of Pechiney, to evaluate potential remedial technologies and provide recommendations for the proposed, preferred remedy for impacted soil and soil vapor within the vadose zone, and impacted concrete at the Site. The FS was submitted to the Department of Toxic Substances Control (DTSC). The FS was completed using the Code of Federal Regulations (CFR), Title 40, Section 300, also known as the National Contingency Plan (NCP), and appropriate guidance documents developed by the United States Environmental Protection Agency (U.S. EPA), including the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Remedial Investigation/Feasibility Study guidance (U.S. EPA, 1988).

This RAP was prepared in accordance with DTSC guidance and policy for RAP development (DTSC policy #EO-95-007-PP), and pursuant to California Health and Safety Code Section 25356.1. This RAP provides the details and procedures for remediating polychlorinated biphenyl (PCB)-impacted concrete during demolition of below-grade features, and remediating impacted soil and soil vapor during and following below-grade demolition. On July 6, 2010, DTSC issued an Imminent and Substantial Endangerment Determination and Consent Order (Order; DTSC, 2010) for the Site. DTSC has the final approval authority for the implementation of this Site-wide RAP. However, pursuant to CFR, Title 40, Subchapter R, Toxic Substances Control Act (TSCA), Part 761 (40 CFR 761), the U.S. EPA has approval authority for risk-based remediation of PCB releases and disposal of PCB remediation waste (soil and concrete). Pechiney will implement the RAP pursuant to the Order, and subject to DTSC's approval of the RAP and U.S. EPA approval of the PCB risk-based application referred to as the Polychlorinated Biphenyls Notification Plan (PCBNP) (AMEC, 2009) for the Site. On July 2, 2010, U.S. EPA issued a conditional approval letter regarding the PCBNP, which outlined requirements for additional PCB sampling and submission of additional information. In the conditional approval letter, U.S. EPA also deferred the approval of the PCB remediation goals until the additional PCB sampling results and information was submitted to U.S. EPA for review, which was submitted to U.S. EPA on December 29, 2010. U.S. EPA's conditional approval of the PCB remediation goals was obtained on July 1, 2011.

1.1 INTRODUCTION

The Site is comprised of approximately 26.9 acres (including Assessor Parcel Numbers 6301-008-010, -011, -012, -013, which was divided into Parcels 6, 7, and 8) and was formerly occupied by approximately 600,000 square feet of building area. The Site was used to manufacture high-precision cast aluminum plates. As part of the demolition work completed in November 2006, the above-ground features, including the former manufacturing facilities, were demolished; leaving the concrete floor slabs in place, and the debris was transported off-site for disposal or recycling.

Remediation of remaining impacted concrete and soil will be conducted in conjunction with demolition of remaining surface slabs and below-grade features. This work will include removal of man-made structures, building slabs, pavements, footings, foundations, pits, and sumps located within the footprint of the former buildings as described in the Below Grade Demolition Plan (AMEC, 2011a) previously approved by the City of Vernon.

1.2 REPORT STRUCTURE

This RAP includes the following information (listed by relevant section).

- Section 1.0 provides an introduction to the RAP and defines the report structure.
- Section 2.0 provides Site background information.
- Section 3.0 summarizes the results of the remedial investigation.
- Section 4.0 describes the removal actions completed to date.
- Section 5.0 presents a summary of Site risks.
- Section 6.0 provides a summary evaluation of the remedial alternatives considered in the FS.
- Section 7.0 discusses implementation of the preferred remedial alternative, and provides additional details related to soil management of any new, undiscovered releases that might be encountered during below-grade demolition or RAP implementation.

- Section 8.0 discusses the public participation and community involvement process.
- Section 9.0 provides report references.

2.0 SITE BACKGROUND

Aluminum Company of America's (Alcoa's) manufacturing operations reportedly began at the Site in approximately 1937 and included production of high-precision cast aluminum plates. As part of their manufacturing operations, Alcoa (original Site owner) used fuels and Stoddard solvent, both of which were stored in underground storage tanks (USTs). Alcoa used Stoddard solvent during the aluminum manufacturing process. Alcoa also operated processes that required lubricating and hydraulic oils and generated hazardous waste that was stored at various locations throughout the Site. The historical Site layout is shown on Figure 2.

Previous investigations were conducted at the Site for soil, groundwater, soil vapor, and building materials. During these investigations, soil impacted with petroleum hydrocarbons (including Stoddard solvent), metals, PCBs, and volatile organic compounds (VOCs) were identified. The presence of chlorinated VOCs also was identified in groundwater at a depth of approximately 150 feet below ground surface (bgs) within the southwestern portion of Parcel 7, west of Building 112A and within the northern portion of the Buildings 106/108 on Parcel 8.

In approximately 1997, Alcoa sold the eastern half of its facility, which subsequently was razed, subdivided, and redeveloped for industrial and commercial uses. Prior to 1999, Alcoa investigated subsurface conditions and conducted limited remediation in both the eastern and western portions of its facility as part of its efforts to close its City of Vernon Health and Environmental Control (H&EC) hazardous materials permit. These activities are described in Section 3. In December 1998, Alcoa sold the western portion of the facility (3200 Fruitland Avenue) to Century Aluminum Company. In 1999, Pechiney purchased the Site, and subsequently closed the Vernon facility in January 2006.

This preferred remedial alternative discussed in this RAP addresses principal risk threats posed by chemicals of concern (COCs) present at the Site. These principal risks include PCB-impacted concrete, surface and shallow COC-impacted soil (at depths less than or equal to 15 feet), deep Stoddard solvent-impacted soil (at depths greater than 15 feet), and deep VOC-impacted soil at the Site. RAP implementation will reduce the potential for risks to human health due to exposure to shallow soil containing COCs, and remediation of deeper COC-impacted soil that may potentially affect groundwater quality.

The RAP also covers the materials management practices that will be implemented during below-grade demolition, and handling of non-COC-impacted concrete and soil at the Site.

3.0 SUMMARY OF REMEDIAL INVESTIGATIONS

Previous remedial investigations performed by prior Site owners and Pechiney are summarized below.

3.1 ALCOA'S PREVIOUS INVESTIGATIONS

Previous investigations were conducted by consultants to Alcoa and were related to closure of Alcoa's facilities and operations on and east of the Site (including Alcoa's efforts to seek closure of its City of Vernon H&EC hazardous materials permit). A summary of previous Alcoa investigations is presented in the Phase I Environmental Site Assessment (ESA) (Geomatrix Consultants Inc. [Geomatrix], 2005a) and the FS (AMEC, 2012a). These previous investigations included the collection and analysis of soil, groundwater, soil vapor, and building materials samples, and were conducted under the oversight of the City of Vernon H&EC. During these investigations, soil impacted with petroleum hydrocarbons (including Stoddard solvent), metals, PCBs, and VOCs were identified. The presence of chlorinated VOCs (trichloroethene [TCE], 1,2-dichloroethane [1,2-DCA], and chloroform) also was identified in groundwater at a depth of approximately 150 feet bgs within the southwestern portion of Parcel 7, west of Building 112A.

Nine groundwater wells were constructed at the Site between 1990 and 1991 by Alcoa under the oversight of the City of Vernon H&EC. All but three of the monitoring wells (AOW-6, AOW-8, and AOW 9; Figure 2) were destroyed by Alcoa under the oversight of the City of Vernon H&EC. The three remaining groundwater monitoring wells are located near former Building 112A in the southern portion of Parcel 7. Groundwater quality data collected from monitoring wells sampled and analyzed between 1990 and 1997 indicated the presence of TCE, 1,2-DCA, and chloroform in groundwater (upper portion of the Exposition aquifer) beneath the southwest portion of the Site with historical concentrations of 160 micrograms per liter (µg/L), 370 µg/L, and 105 µg/L, respectively, of TCE, 1,2-DCA and chloroform (Enviro-Wise, 1998). The highest concentrations of these VOCs were detected in groundwater in the vicinity of the former Stoddard solvent USTs located outside of Building 112A in Parcel 7.

Previous evaluations conducted by Alcoa suggested the source of VOCs in groundwater in the southwest portion of Parcel 7 was from an upgradient, off-site source. At the time, the City of Vernon H&EC concurred with this evaluation, but because the closure of the groundwater wells required the California Regional Water Quality Control Board, Los Angeles Region

(RWQCB) concurrence and approval, Alcoa submitted its recommendations for Site closure to the RWQCB on February 18, 1999 (Alcoa, 1999). Because groundwater at these wells was impacted with chlorinated VOCs and because the wells were located in an area associated with the former Stoddard solvent USTs, the RWQCB required that Alcoa perform additional analysis of groundwater for methyl tertiary-butyl ether and fuel oxygenates (RWQCB, 2002). Alcoa conducted additional monitoring of the remaining three groundwater wells in 2005 and 2006 and submitted the monitoring data to the RWQCB. Based on the monitoring results, the concentrations of chlorinated VOCs decreased relative to the concentrations reported earlier (1990-1997). The compounds TCE, 1,2-DCA, and chloroform were detected at concentrations up to 28 µg/L, 6.1 µg/L, and 8.6 µg/L, respectively, during the most recent sampling event conducted in 2006 (URS Corporation [URS], 2006). These compounds were not detected in groundwater samples collected from well AOW-6.

In a March 28, 2008 letter, the RWQCB directed Alcoa to 1) provide a work plan to characterize residual soil contamination in the former Stoddard solvent UST area and submit a Site-specific health and safety plan by April 25, 2008; 2) sample the groundwater wells in the former UST area (AOW-7, AOW-8 and AOW-9) or install and sample replacement groundwater wells if AOW-7, AOW-8 and AOW-9 cannot be used or located; 3) submit additional historical reports and data related to the Stoddard solvent releases; 4) analyze soil and groundwater for a specific suite of petroleum hydrocarbon compounds and VOCs; 5) log and sample soil at 5-foot intervals, at lithologic changes, or observed impacted soil; and 6) initiate electronic submittals through the State database (RWQCB, 2008a).

On December 18, 2008, the RWQCB (2008b) determined that the impacts associated with chlorinated solvents in soil and groundwater at the Site, including the area of the former Stoddard solvent USTs, should be addressed under the jurisdiction of the DTSC. On January 16, 2009, the RWQCB confirmed completion of Alcoa's site investigation and corrective actions to address soil impacts related to eight former USTs containing gasoline, diesel/No. 2 fuel oil, and waste oil. The RWQCB specially excluded "subsequent investigations and/or remediation of the residual contamination associated with chlorinated solvents in soil and groundwater for the entire Site, including the area [formerly] containing four Stoddard solvent USTs." In addition, RWQCB closure documentation specifically excluded the closure of the four Stoddard solvent USTs (referred to as USTs T-9 through T-12). The RWQCB deferred these remaining issues to the DTSC's oversight. Although the Stoddard solvent impacts remain the responsibility of Alcoa, as directed by September 2, 1999 and July 18, 2006 letters from the City of Vernon H&EC, and a January 16, 2009, letter from the RWQCB, Alcoa has not taken responsibility for these impacts. Pursuant to the DTSC

Order and the above actions, the Stoddard solvent-impacts and associated residual petroleum hydrocarbon-impacts have been included in this RAP.

3.2 GEOMATRIX INVESTIGATIONS

In June 2005, Geomatrix conducted a Phase I ESA (Geomatrix, 2005a) at the Vernon Facility to identify Recognized Environmental Conditions (RECs) as defined by ASTM International, Inc. E1527-00 for Phase I ESAs. In addition to identifying RECs, Geomatrix identified historical RECs and the potential of other environmental conditions (OECs) at the Site. The Phase I ESA report was submitted to the City of Vernon H&EC on September 1, 2005, and the City of Vernon H&EC concurred with the findings in their letter dated September 26, 2005. The findings of the Phase I ESA indicated the need for additional subsurface investigation work at the Site. Geomatrix submitted a Phase II ESA work plan (Geomatrix, 2005b) to the City of Vernon H&EC on September 2, 2005, and the work plan was approved by the City of Vernon H&EC on September 26, 2005 (City of Vernon H&EC, 2005). A summary of the Geomatrix investigations is described in the following subsections.

3.2.1 Phase II Investigation

Based on the findings of the previous investigations and the manufacturing operations in each building and/or area, these chemicals of potential concern (COPCs) were identified:

- total petroleum hydrocarbons (TPH), including Stoddard solvent compounds;
- PCBs (as total Aroclors);
- VOCs;
- metals, including hexavalent chromium [Cr (VI)]; and
- semi-volatile organic compounds (SVOCs).

Based on Alcoa's historical groundwater monitoring results, TCE; 1,2-DCA; and chloroform were identified as groundwater COPCs at the Site.

A Phase II investigation was conducted as the initial remedial investigation at the Site between November and December 2005. The investigation was conducted to evaluate whether the RECs or OECs identified in the Phase I ESA had resulted in releases to the subsurface soil and/or groundwater at the Site. The initial remedial investigation included the collection and analysis of concrete, soil vapor, and soil samples for a number of constituents. The findings of the investigation were submitted to the City of Vernon H&EC in a report dated March 9, 2006 (Geomatrix, 2006b).

Soil and soil vapor data collected during the Phase II investigation were evaluated using a stepped screening process to evaluate the potential for groundwater impacts and the potential for risks to human health due to exposure to shallow soil containing COPCs. The initial step of the screening process was used to evaluate potential VOC impacts and the need to collect additional soil samples. Based on the soil vapor results obtained in Building 106, the collection and analysis of additional soil samples were required to further assess potential VOC impacts.

The second step of the screening evaluation included a comparison of the Phase II soil sample results to the following prescriptive regulatory screening levels.

- RWQCB Interim Site Assessment and Cleanup Guidebook (May 1996, and updated March 2004) groundwater protection screening levels for carbon range-specific petroleum hydrocarbons and aromatic hydrocarbons (benzene, toluene, ethylbenzene, and total xylenes [BTEX] compounds) in soil. The selected screening levels were obtained from Table 4-1 of the above-referenced RWQCB guidance assuming a sand lithology and a depth to groundwater of 150 feet.

- U.S. EPA Region IX Preliminary Remediation Goals (PRGs) for industrial sites and concentrations for VOCs, SVOCs, PCBs, and metals in soil (U.S. EPA, 2004).

- U.S. EPA Region IX soil screening levels (SSLs) for the protection of groundwater using a default dilution attenuation factor of 20 (DAF20) for VOCs, SVOCs, and metals, where available (U.S. EPA, 2004).

- California Background Concentrations of Trace and Major Elements in California Soil (Bradford, et al., 1996).

- California Code of Regulations, Title 22, Total Threshold Limit Concentration and Soluble Threshold Limit Concentration for metals and PCBs in building materials (waste characterization).

Based on the data collected during the Phase II investigation and the above screening evaluation process, certain areas at the Site were identified as impacted by one or more COPCs at concentrations greater than the screening criteria. Although the screening criteria are not intended to be remediation goals, they were used to evaluate the potential need for further action (such as additional investigation, analysis, or potential remediation). Remediation goals may differ from screening levels based on Site-specific considerations (e.g., redevelopment, future land use, potential exposure pathways, etc.), regulatory requirements, evaluation of risk, or other relevant factors as set forth in NCP 40 CFR 300.

The following areas of the Site had COPCs that exceeded one or more of the screening criteria (the boring locations discussed below are shown on Figure 3). For each of these areas, the results of the Phase II investigation indicated that additional investigation was required and the City of Vernon H&EC approved these subsequent investigatory actions on March 20, 2006.

- Building 104 – PCBs were detected in the concrete slab and soil to a depth of 3 feet bgs adjacent to the location of a saw (borings 41, 73, and 74). Additional soil borings were required in the vicinity of the saw to assess the source and extent of PCBs detected in concrete and the underlying soil.

- Building 104 – PCBs were detected in soil to a depth of approximately 71.5 feet bgs in the vicinity of a vertical pit and a former vertical pit (boring 40). Additional soil borings were required near both vertical pits to assess the source and extent of PCBs detected in soil.

- Buildings 106 and 108 – TCE was detected in soil beneath the northern portion of the buildings to a depth of approximately 48 feet bgs (boring 14), and TCE was detected in soil vapor. Additional investigation of the lateral extent of TCE in soil and its potential impacts to groundwater was required in this area.

- Building 112 (former etch station) and near storm water outfall #6 – one or more metals were detected in soil to a depth of 6 feet bgs (boring 113). Additional investigation of the lateral extent of metals in shallow soil was required in these areas.

- Former Substation #8 – PCBs were detected in the soil and gravel drainage area of the former substation to a depth of 2.2 feet bgs (boring 39), but PCBs were not detected in the soil boring adjacent to the drainage area. Additional investigation of the depth of the soil and gravel drainage area and the concentrations of PCBs in these materials was required.

Although concentrations of COPCs in other areas of the Site did not exceed screening criteria, additional remedial investigations were required by the City of Vernon H&EC at three locations to obtain a better understanding of the source of the deeper soil impacts and to confirm that soil concentrations were not increasing with depth. These three locations are listed below.

- Building 106 – Stoddard solvent-range petroleum hydrocarbons were detected in one soil sample at a depth of approximately 46.5 feet bgs (boring 13). Because these hydrocarbon compounds were not detected in shallow soil at this boring or in soil vapor in the vicinity of the boring, further investigation of the source of these compounds at 46.5 feet bgs in soil was required.

- Building 112 – TPH concentrations in soil increased with depth at a boring drilled to a depth of 9.6 feet adjacent to a former sump (boring 30). Although the hydrocarbon concentrations were below the screening levels, their vertical extent in soil adjacent to the sump had not been characterized and required further evaluation.

- Cooling Tower area – Cr (VI) and PCBs (Aroclor-1248) were detected in one soil sample from boring 46 at a depth of 21.1 feet bgs (the bottom of the boring). PCBs and Cr (VI) were not detected in shallow soil samples collected from boring 46, and therefore, further investigation of the source of PCBs and Cr (VI) detected at 21.1 feet bgs in soil was required.

3.2.2 Supplemental Phase II Investigations

The Phase II remedial investigation results indicated a need to 1) assess the extent of impacted soil exceeding the screening criteria, 2) assess potential impacts to groundwater, and 3) further understand the subsurface conditions at the Site for each of the areas identified in Section 3.2.1. Therefore, a Supplemental Phase II investigation was required in specific areas of the Site to further characterize the extent of impacted soil and/or existing subsurface conditions for the reasons described above in Section 3.2.1. On March 9, 2006, Geomatrix submitted a proposed plan to the City of Vernon H&EC to further characterize the extent and potential significance of COPCs exceeding screening criteria in soil at the Site and the potential impacts to groundwater related to TCE detections in soil and soil vapor in Buildings 106 and 108. On March 20, 2006, the City of Vernon H&EC approved the Supplemental Phase II investigation plan, and the investigation was conducted between March 28, 2006, and April 24, 2006.

Based on the findings of the initial Supplemental Phase II investigation, a follow-up investigation was required to further characterize the extent of VOCs detected in soil, soil vapor, and groundwater in the north portion of the Site. In a letter to the City of Vernon H&EC dated May 9, 2006, Geomatrix identified additional sampling points in Buildings 106, 108, and 112. Under approval and direction from the City of Vernon H&EC, the additional investigation work began on May 11, 2006, and was completed on May 24, 2006. The findings of the Supplemental Phase II investigation were submitted to the City of Vernon H&EC in a report dated December 19, 2006 (Geomatrix, 2006c).

Soil data collected during the Supplemental Phase II investigation were evaluated using the stepped screening process discussed in Section 3.2.1, and sample locations where COPCs were detected above the screening levels are described in Section 3.5.

3.2.3 Geomatrix Concrete Characterization for PCBs as Aroclors

In addition to the concrete testing conducted during the Phase II investigation, coring and testing of the concrete slabs and concrete transformer pads were performed during and after above-grade demolition work to further characterize PCB-impacted concrete. PCBs were detected in concrete samples at "total Aroclor" concentrations (the sum of detected Aroclor-1016, -1221, -1232, -1242, -1248, -1254, and -1260) greater than 1 milligram per kilogram (mg/kg) in portions of Buildings 104, 106, 108, 110, 112, and 112A. A summary of PCBs as total Aroclor concentrations for the concrete samples is depicted on Figure 4. The results for all tested Aroclors (Aroclor-1016, -1221, -1232, -1242, -1248, -1254, and -1260) are provided in Appendix A of the FS (AMEC, 2012a).

3.3 AMEC Supplemental Soil Vapor Testing

As a continuation of the remedial investigation work at the Site, Pechiney was directed by DTSC to conduct an off-site soil vapor survey at the intersection of Fruitland and Boyle Avenues near the northwest corner of the Site in July of 2009. DTSC required the work to assess the off-site extent of VOC concentrations in shallow soil vapor in the vicinity of former Building 106. In addition, and in order to meet DTSC's requirements for evaluating human health risk related to vapor intrusion, a shallow soil vapor survey was conducted within the footprint of Building 112A and to the west of the building in the vicinity of the former Stoddard solvent UST area. This work was required due to the lack of soil vapor data. The soil vapor survey was conducted to complete the human health risk assessment (HHRA) for potential indoor air exposure to Stoddard solvent and associated compounds. The findings of this work are provided in the FS and tabulated analytical results are included in Appendix A of the FS (AMEC, 2012a). Sample locations are shown on Figure 3. Based on the off-site soil vapor testing conducted in July 2009, the sample results indicated the following:

- TCE and tetrachloroethene (PCE) were detected in all shallow soil vapor samples (locations 161 through 164) at depths of 5 and 15 feet. Other VOCs, 1,1,1-trichloroethane (1,1,1-TCA; location 163 at 15 feet) and 1,1-dichloroethene (1,1-DCE at sample location #164 at 15 feet) were detected in only one sample each. No other VOCs were detected.

- TCE soil vapor concentrations decreased to the north, northwest (with the exception of the 15-foot sample at 164), and west of the Site, while the PCE soil vapor concentrations increased. TCE and PCE soil vapor concentrations also increased with depth. Assuming the suspected on-Site source area for the Site-derived TCE is present in the northwest corner of the Site, a threefold decrease in the concentration of TCE in soil vapor was measured between the on-Site sample location 81 and the off-site sample location 162, approximately 60 feet north. This reduction in concentration was also observed to the west between on-Site sample location 82 and off-site sample location 164. Based on this observation, the Site-derived VOCs will continue to decrease at further distances from the Site and co-mingle with other potential source(s) in a highly industrial area.

- The highest PCE soil vapor concentration was detected at the furthest point from the Site on Fruitland Avenue (at sample location 163, see Figure 3). At this sample location, the TCE concentration in the 15-foot sample also was higher than the 15-foot sample results obtained for TCE at the two off-site sample locations (162 and 164) closer to the Site. The higher PCE concentrations at the off-site sample location suggest the presence of an off-site source or sources of VOCs. For example, sample location 163 is approximately 140 feet northwest of the Site, and approximately 300 feet east of the former solvent recycling facility (referred to as Detrex Solvent Division Facility located on Fruitland Avenue and listed with a land use deed covenant in EnviroStor[1]). At this former facility, a soil removal action was conducted in 2001 to a depth of 20 feet in a localized area that exhibited elevated concentrations of PCE in soil (1100 mg/kg at 4 feet) and soil vapor (34 milligrams per liter at 20 feet) (URS, 2002). Other VOCs, TCE and 1,1,1-TCA, also were detected but at a much lower concentrations. In addition, a recent investigation conducted by Tetra Tech Inc. (May 2011) at a facility located on Fruitland Avenue, approximately 700 feet west of the Site also identified PCE and TCE in soil vapor. At this facility, PCE and TCE were detected in soil vapor at 5 and 20 feet bgs at concentrations up to 100 µg/L, with the highest concentration reported for PCE in a hazardous materials storage area.

- Calculated molar ratios of PCE to TCE (0.10 and 0.42) are an order of magnitude higher at three of the off-site soil vapor sample locations 162, 163, and 164. The molar ratios calculated for the on-Site samples located in the suspected on-Site source area ranged between 0.01 and 0.087. The distribution of PCE to TCE is presented graphically on Figures 5 and 6. The PCE to TCE molar ratios further suggest the probability of an off-site source or sources of PCE and TCE in the vicinity of the off-site sample locations 162, 163, and 164.

3.4 AMEC SUPPLEMENTAL GROUNDWATER TESTING

Based on a request from DTSC, a groundwater sampling event was conducted at the Site in May 2011 for VOC and perchlorate testing. Monitoring wells AOW-6 and AOW-8 were redeveloped and sampled in May 2011. Monitoring well AOW-9 could not be developed or sampled due to a migratory bird nesting near the well location. Perchlorate and VOCs were not detected in the groundwater samples collected from AOW-6 and AOW-8. Tabulated analytical results from this sampling event are included in Appendix A of the FS (AMEC, 2012a), and the monitoring well locations are shown on Figure 2. Historically, groundwater samples from AOW-8 contained 1,2-DCA, TCE and chloroform, with TCE and 1,2-DCA detected above the respective maximum contaminant levels (MCLs). As discussed in Section 3.6 below, the presence of these compounds in groundwater may be attributed to

[1] EnviroStor, February 2012

an off-site source, and the reduction in VOC concentrations to non-detected levels at AOW-8 indicates natural attenuation of VOCs is already occurring in groundwater beneath the Site.

3.5 AMEC SUPPLEMENTAL SOIL AND CONCRETE CHARACTERIZATION

In July 2009, AMEC submitted the PCBNP (AMEC, 2009) to U.S. EPA for approval of a risk-based application for on-Site remediation of PCB releases and disposal of PCB remediation waste (soil and concrete). The PCBNP was prepared in compliance with 40 CFR 761 (Subchapter R, TSCA), including applicable amendments (June 29, 1998, 40 CFR Parts 750 and 761, Disposal of Polychlorinated Biphenyls, Final Rule). Following U.S. EPA's review of the risk-based application, U.S. EPA required additional testing, which included the following:

- collection and analysis of additional concrete cores for PCBs as Aroclors from 50 randomly selected concrete slab areas;
- collection and analysis of soil directly beneath PCB-impacted concrete slabs (referred to as sub-slab soil samples), where the total Aroclor concentration of the concrete slab exceeded the then proposed remediation goal of 5.3 mg/kg for concrete; and
- collection and analysis of additional soil and concrete for PCBs and dioxin-like PCB congeners to support the HHRA and proposed risk-based remediation goals for PCBs.

Specific protocols and sampling requirements were outlined in a draft Concrete and Soil Sampling and Analysis Plan (SAP; AMEC, 2010), which was submitted to U.S. EPA pursuant to its conditional approval of the PCBNP (U.S. EPA, 2010). The SAP was approved with modifications by U.S. EPA on August 30, 2010. The sampling covered under the SAP was conducted between September 9, 2010, and October 18, 2010, with final laboratory analytical data received on November 8, 2010. The results of the additional PCB (tested Aroclors and sum of detected Aroclors) concrete and soil sampling are provided in Appendix A of the FS (AMEC, 2012a); a summary of total Aroclor concentrations for the 2010 concrete samples are shown on Figure 4.

3.6 AREAS OF IMPACT

Although the screening criteria described in Section 3.2.1 are not intended to be remediation goals, one or more COPCs were detected in soil and/or concrete at concentrations above these screening criteria during the Phase II and Supplemental Phase II investigations conducted by Geomatrix and AMEC. The areas identified as impacted by one or more COPCs with concentrations exceeding these initial screening criteria are described below and sample locations are shown on Figures 3 and 4.

With the exception of storm water outfalls #6 and #7 and former hot well area, these areas were not previously identified as being impacted by VOCs or PCBs.

- Northern Portion of Buildings 106, 108, and 112 – TCE was detected in soil vapor, soil, and groundwater in the northwestern portion of the Site. Data collected to date indicate the likely presence of a source of VOCs in soil and groundwater in the northwest corner of Building 106. TCE and PCE concentrations detected in soil exceed the U.S. EPA Region IX SSL for the protection of groundwater (using a DAF20) in this area. TCE was detected in groundwater samples collected from a depth of approximately 150 feet bgs at concentrations ranging from 72 µg/L to 420 µg/L. In addition, PCBs were detected in the concrete slab in portions of these buildings, and PCBs were detected in sub-slab soil samples at three discrete locations between Building 106 and 108 (sample locations 191, 193 and 195).

- Off-site Northwest of Building 106 - the investigation of off-site soil vapor concentrations to the northwest of Building 106, at the intersection of Fruitland and Boyle Avenues, identified TCE and PCE in shallow soil vapor samples at depths of 5 and 15 feet (sample locations 161 through 164; Figures 5 and 6). At these off-site locations, TCE soil vapor concentrations decreased to the north, northwest and west of the Site, while the PCE soil vapor concentrations increased. For comparison, the molar ratios of PCE to TCE (0.10 and 0.42) were an order of magnitude higher at three of the off-site soil vapor sample locations. The molar ratios calculated for the on-Site samples from the suspected source area ranged between 0.01 and 0.087. The observed higher PCE concentrations and PCE to TCE molar ratios suggest the probability of an off-site source or sources of PCE and TCE in the vicinity of the off-site sample locations (162, 163, and 164).

- Southern Portion of Building 106 – aromatic VOCs, primarily benzene, were detected in soil and groundwater in the southern portion of the building at borings 125 and 135. Benzene was detected in groundwater samples at concentrations ranging from 2.8 µg/L to 3.3 µg/L. PCBs also were detected in the concrete slab at the southwest corner of this building, at isolated locations within the sub-slab soil (sample locations S-1 and 39) underlying the concrete slabs, and at near former Substation 8 (sample location S-1).

- Storm Water Outfall #7 – PCBs were detected in soil at a depth of 5.7 feet bgs at boring 182.

- Existing and Former Vertical Pits in Building 104 – PCBs were detected in soil to a depth of 31 feet bgs at boring 98 and at depths between 10 and 71.5 feet bgs at borings 40, 94, 95, and 189.

- Northwestern Portion of Building 104 – PCBs were detected in the concrete slab at the northwest corner of the building. PCBs were not detected in soil samples from borings 115, 116, 117, 118, and 119 located in this area of the building or from the sub-slab soil sample locations 215 through 225.

- Saw Area in Building 104 – PCBs were detected in soil to a depth of 3 feet bgs at borings 41, 73, and 100 and from the sub-slab soil sample locations 228 through 233 and 236. PCBs also were detected in the overlying concrete slabs near these boring and sample locations and surrounding the location of the saw.

- Former Hot Well area – PCBs were detected in soil at a depth of 2.7 feet bgs at boring 175.

- Building 112A and West of Building 112A – Stoddard solvent and associated VOC compounds (naphthalene, trimethylbenzenes [TMBs], and xylenes) were detected in soil vapor at depths of 5 and 15 feet bgs.

- Former Scalper/Planar Area – PCBs were detected in soil at a depth of 0.8 feet bgs at boring 183.

- Near Storm Water Outfall #6 – copper and lead were detected at a depth of 6.2 feet bgs at former boring 47, and arsenic was detected at a depth of 6.0 feet bgs at boring 113. PCBs also were detected in soil at a depth of 4.5 feet bgs at boring 176.

In order to further evaluate these areas of impacted soil vapor, soil or concrete, the Phase II data, the Supplemental Phase II investigation data, and all other COPCs detected in soil and soil vapor at the Site were evaluated for potential human health risks using a screening-level HHRA pursuant to NCP 40 CFR 300.430(d)(1) and DTSC guidance documents. The screening-level HHRA and the potential impacts of these COPCs to groundwater are presented and evaluated in the FS (AMEC, 2012a). A summary of the screening-level HHRA is presented in Section 5.0.

3.7 GROUNDWATER IMPACTS AND NATURAL ATTENUATION

Groundwater samples collected at the Site contain TCE at concentrations above the MCL, and based on Site data and the reported groundwater flow direction (west-northwest), there are at least three potential sources of TCE and VOCs in groundwater as described below. Tabulated groundwater analytical results are included in Appendix A of the FS (AMEC, 2012a).

- Northwest portion of the Site: TCE impacts to groundwater in this portion of the Site may be attributed, to some degree, to historical manufacturing operations in the northwestern portion of the Site (e.g. Building 106 as described further in Section 3.6). This statement is based on the detection of TCE and other VOCs in the northwest portion of the Site in soil, soil vapor, and groundwater samples. In this area of the Site, TCE was detected in hydropunch groundwater samples from sample locations 125, 126, 132, 133, and 134 at concentrations ranging between 71 µg/L and 420 µg/L.

- Off-site Source(s) to the south, southeast, and southwest: TCE and other VOC impacts to groundwater in the southern portion of the Site, near the former Stoddard solvent USTs, may be attributed to an off-site source or sources. This statement is based on the fact that TCE or other related VOCs were not detected in soil and soil vapor samples collected in the southern portion of the Site. Historical records reviewed at the RWQCB and on GeoTracker[2], suggest the presence of several off-site sources including the former Bethlehem Steel site, located upgradient of the Site (just south of Slauson Avenue – also known as Vernon Parcels/Lots) and the former Trico site located southwest of the intersection of Boyle Avenue and Slauson Avenue (Environmental Audit Inc., 2009). In addition, detected concentrations of the chlorinated VOCs, 1,2-DCA, chloroform, and TCE in groundwater in the southern portion of the Site (former monitoring wells AOW-3 and AOW-7 and existing monitoring wells AOW-8, and AOW-9; see Figure 2) have decreased (attenuated) since the initial sampling event in 1991.

- Off-site source(s) to the east: TCE impacts to groundwater may be present to the east of the Site, beyond Alcoa Avenue. This statement is based on historical groundwater data collected from a former Alcoa monitoring well AOW-4, which was located in the northeast corner of the original Alcoa property (see Figure 2) near the intersection of Alcoa Avenue and Fruitland Avenue. During previous monitoring events, TCE was detected in the groundwater samples collected from monitoring well AOW-4 at concentrations up to 220 µg/L, indicating the presence of another potential regional source of TCE in groundwater east of the Site. In addition, the TCE concentrations reported for monitoring well AOW-4 decreased with time since the initial sampling event in 1990.

4.0 REMOVAL ACTIONS COMPLETED TO DATE

This section summarizes removal actions and follow-up, additional investigations performed by Alcoa, along with facility building demolition actions performed by Pechiney.

4.1 ALCOA'S PREVIOUS REMEDIAL ACTIVITIES

Consultants to Alcoa have previously conducted remediation activities in specific areas of the Site under the direction of the City of Vernon H&EC. These remediation activities are briefly described below.

- July to October 1992 – excavation of diesel fuel-impacted soil in conjunction with removal of three 10,000-gallon diesel USTs and a pump vault located south of electrical substation #2. The excavations were backfilled with engineered fill, compacted, and capped with concrete (OHM Remediation Services Corporation, 1992).

- January 1995 – removal of four 10,000-gallon Stoddard solvent USTs located west of Building 112A. The maximum excavation depth was 18 feet bgs. The area was backfilled with Stoddard solvent-impacted soil from 3 to 18 feet bgs. At that time,

[2] GeoTracker, February 2012

the City of Vernon H&EC "agreed that Alcoa could place the contaminated soil back into the excavation, provided that Alcoa would remediate the Site within a reasonable time frame" (CCG Group, Inc., 1995). A 6-mil plastic liner was placed over the Stoddard solvent-impacted soil, and clean soil was backfilled over the liner from 3 feet bgs to grade. The area was then capped with concrete.

Following the removal of the Stoddard solvent USTs and delivery system in January 1995, Alcoa conducted a soil investigation to evaluate the extent of the Stoddard solvent impacts (Morrison Knudsen Corporation, 1995). A number of investigations were performed by Alcoa between 1995 and 2005 (Environmental Protection and Compliance, 2006), and these investigations are described below.

- September through October 1995 – Alcoa conducted an initial soil investigation to evaluate the extent of Stoddard solvent-related soil impacts beneath Building 112A and west of the building near the former Stoddard solvent USTs (Morrison Knudsen Corporation, 1995). The areas investigated included the former tube mill and roll stretcher machine area (Area "A" borings), the former tube mill Stoddard solvent dip tanks and vault (Area "B" borings), the scalper planar machine and Stoddard feed line area (Area "C" borings), and the Stoddard solvent still house and UST area (Area "D" borings). Soil borings were advanced to depths between 45 to 67.5 feet bgs and cone penetration test/rapid optical screening test (CPT/ROST) borings were advanced to depths between 34 and 80.7 feet bgs. Petroleum hydrocarbon analyses included quantification of total volatile petroleum hydrocarbons (TVPH; carbon-chain range of c6 – c10) and total extractable petroleum hydrocarbons (TEPH; carbon chain range of c10 – c28). The soil TVPH concentrations ranged between 1.1 mg/kg to 76,000 mg/kg and TEPH concentrations ranged between 5.4 mg/kg to 53,000 mg/kg. The highest concentrations of these compounds were detected in Area B at depths between 46.5 and 50 feet bgs. Several soil samples also were tested for BTEX compounds, and these compounds were detected in soil. Based on AMEC's review of the soil sample analytical results and qualitative petroleum hydrocarbon measurements obtained by CPT/ROST methods, the extent of these soil-impacts was assessed with the exception of two areas. The vertical extent of petroleum hydrocarbon-impacted soil was not completely assessed in Areas B and D. The approximate lateral extent of the Stoddard solvent-related soil impacts are shown on Figure 3 and the historical analytical soil results are included in Appendix A of the FS (AMEC, 2012a).

- August to November 1995 – Alcoa completed laboratory bench-scale treatability testing on Stoddard solvent-impacted soils obtained from the subsurface in the vicinity of former solvent handling and storage areas within Building 112A. The testing was conducted to determine the applicability of in situ bioremediation of vadose zone soils. The treatability testing included the use of bioslurry reactor vessels and soil column reactors (Alcoa Technical Center, 1996a).

- Analytical testing indicated that appropriate environmental conditions (including pH, naturally occurring nutrients, indigenous microbial populations, and soil moisture) existed to depths of 45 feet bgs that would be supportive of in situ biodegradation of Stoddard solvent-impacted soil. The primary findings associated with the bioslurry reactor testing indicated that under optimal test conditions, 50 percent of the hydrocarbons were degraded within four weeks under aerobic conditions within the reactor, and that less than 5 percent of the hydrocarbons were lost due to volatilization. The primary findings from column reactor studies further supported that Stoddard solvent-impacted soils were amenable to biodegradation as hydrocarbon concentrations were reduced by 93 to 95 percent using a combination of biodegradation (80 percent) and volatilization (13 to 14 percent). Furthermore, significantly high levels of heterotrophic bacteria (10^8 to 10^9 colony forming units per gram of soil dry weight [cfu/gm-dw soil] and hydrocarbon degraders (10^5 to 10^6 cfu/gm-dw soil) were found to be present within the soil (Alcoa Technical Center, 1996a). The results indicated that the addition of moisture and nutrients did not significantly alter degradation rates of the hydrocarbons.

- In 1995, on behalf of Alcoa, Morrison Knudson Corporation and Groundwater Technology performed field trial tests to evaluate the applicability of soil vapor extraction (SVE) and bioventing technologies as remedial alternatives to mitigate the Stoddard solvent-impacted soils at the Site. Test procedures consisted of both vapor extraction and air injection with monitoring for oxygen, carbon dioxide, and soil gas. The report concluded that both technologies were viable and could be implemented if desired to remediate the Stoddard solvent-impacted soils (Alcoa Technical Center, 1996a).

- In 1996, Alcoa generated additional field respirometry testing data suggesting that naturally-occurring aerobic and anaerobic intrinsic bioremediation was on-going at the Site. The data indicated that natural aerobic degradation was occurring due to available molecular oxygen at rates of 200 to 400 mg/kg per year (mg/kg/year). The data also indicated that much slower degradation rates of 7 mg/kg/year were occurring through anaerobic biodegradation. The report indicated that Alcoa proposed intrinsic bioremediation (also referred to as monitored natural attenuation) as the passive full-scale remediation approach for Stoddard solvent-impacted soils (Alcoa Technical Center, 1996b).

- September and October 2005 - Alcoa conducted additional soil testing in 2005 to monitor the progress of the natural degradation of Stoddard solvent-related soil impacts in soil boring areas A, B, C and D (Environmental Protection and Compliance, 2006). AMEC compared the soil data collected in 2005 by Environmental Protection and Compliance to the soil data collected in 1995 by Morrison Knudsen Corporation to evaluate petroleum hydrocarbon concentration changes over time. The findings of this comparison are summarized below.

o

Area	Findings
A	• TVPH and TEPH concentrations decreased over time. • Remaining TVPH and TEPH maximum concentrations reported in 2005 were at 6080 mg/kg and 6200 mg/kg, respectively. • Concentrations greater than 1000 mg/kg remain at depths of 30 and 40 feet. • Vertical extent of soil impacts was assessed to 60 feet.
B	• TVPH and TEPH concentrations increased over time at several depth intervals. • Remaining TVPH and TEPH maximum concentrations reported in 2005 were at 41,600 mg/kg and 60,600 mg/kg, respectively (at a depth of 45 feet in boring B-1). • Concentrations greater than 10,000 mg/kg remain at depths of 45 and 50 feet. • Vertical extent was not assessed; TPH-impacted soil was detected to a depth of 50 feet.
C	• TVPH and TEPH concentrations decreased over time. • Remaining TVPH and TEPH maximum concentrations reported in 2005 were at 2220 mg/kg and 2500 mg/kg, respectively. • TVPH concentrations greater than 1000 mg/kg remain at a depth of 15 feet and TEPH concentrations greater than 1000 mg/kg remain at depth of 45 feet. • Vertical extent of soil impacts was assessed to 65 feet.
D	• TVPH and TEPH concentrations increased over time at several depth intervals. • Remaining TVPH and TEPH maximum concentrations reported in 2005 were at 6020 mg/kg and 10,800 mg/kg (at 45 feet at boring D-2). • TVPH and TEPH concentrations greater than 1000 mg/kg remain at depths of 15, 43, and 44.5 feet and TEPH concentrations greater than 10,000 mg/kg remain at a depth of 45 feet. • Vertical extent was not assessed; TPH-impacted soil was detected to a depth of 45 feet.

- o Based on the soil investigations and treatability testing described in a report prepared by Environmental Protection and Compliance in 2006, Alcoa recommended to the City of Vernon H&EC that long-term natural attenuation of the Stoddard solvent-impacted soils beneath Building 112A be allowed to continue as a passive remedy (Alcoa Technical Center, 1996c). The City of Vernon H&EC replied that the remaining Stoddard solvent contamination still exceeded cleanup standards and required Alcoa to submit a plan by August 31, 2006 for active remediation of this area (City of Vernon H&EC, 2006). Alcoa has not submitted its active remediation plan and has not performed any additional monitoring or active remediation work in this area. Alcoa's refusal to submit an active remediation plan is documented in an August 30, 2006 letter that Alcoa submitted to the City of Vernon H&EC (Alcoa, 2006).

- April 1998 – excavation of TPH-impacted soil in conjunction with removal of the Stoddard solvent Tube Mill dip tank located in Building 112A. The maximum excavation depth was 15 feet bgs. The area was backfilled with pea gravel and capped with concrete (A.J. Ursic, Jr., 1999a).

- June 1998 – excavation of TPH-impacted soil in conjunction with the removal of a sump from the 3-inch tube reducer foundation located in Building 112A. The maximum excavation depth was 5 feet bgs. The area was backfilled with native soil and capped with concrete (A.J. Ursic Jr., 1999a).

- October 1998 – excavation of refractory and asbestos-containing materials found in soil in conjunction with the construction of a sanitary pipeline located east of Building 112A. The maximum excavation depth was 4 feet bgs. The area was backfilled with road base and capped with asphalt (A.J. Ursic Jr., 1999a).

- December 1998 – excavation of PCB- and TPH-impacted soil in conjunction with the removal of an inert waste disposal pit located west of Building 112A and south of the cooling tower. The maximum excavation depth was 45 feet bgs. Soil removal was terminated due to the proximity of the railroad tracks along the south and west sides of the excavation. The area was backfilled with soil and road base and capped with concrete (A.J. Ursic Jr., 1999a).

- January 1999 – excavation of PCB-impacted soil near storm water outfall #7 located west of Building 104. The maximum excavation depth was 6 feet bgs. The area excavated was limited by the presence of the adjacent sidewalk, building structures, and railroad tracks. The area was backfilled and capped with road base (A.J. Ursic Jr., 1999b).

- April 1999 – excavation of PCB-impacted soil at the discharge point of storm water outfall #6 located southwest of the cooling tower. The maximum excavation depth was 2 feet bgs. The area was backfilled and capped with road base (A.J. Ursic Jr., 1999a).

- April 1999 – excavation of PCB-impacted soil adjacent to the hot well along the north side of the cooling tower. The maximum excavation depth was 3 feet bgs. The area was backfilled and capped with road base (A.J. Ursic Jr., 1999a).

- May 1999 – excavation of PCB-impacted soil in conjunction with removal of a former condenser pad located outside the northwest corner of Building 106. The maximum excavation depth was 2 feet bgs. The area was backfilled with native soil and capped with concrete (A.J. Ursic Jr., 1999b).

- May 1999 – excavation of lead-impacted soil from a former ceramic disposal pit located beneath Building 135 on Parcel 6. The maximum excavation depth was 2 feet bgs. The area was backfilled with native soil and capped with asphalt (A.J. Ursic Jr., 1999c).

- June 1999 – excavation of PCB-impacted soil in conjunction with the removal of a French drain in Press Pit #2 located in Building 106. The maximum excavation depth was 7 feet bgs. The area was backfilled and capped with concrete (A.J. Ursic Jr., 1999b).

The areas where previous remediation activities occurred as described above, including approximate horizontal limits of the excavation, excavation depth, and concentrations of remaining COPC, are shown on Figure 3. As discussed in the FS (AMEC, 2012a) and Section 3.1 of this document, the City of Vernon H&EC issued a closure letter to Alcoa in 1999 with the stipulation that Alcoa would continue to maintain responsibility for the Stoddard solvent-impacted soil. The letter also stated that further review or determinations may be necessary if new information related to environmental conditions at the Site is found (City of Vernon H&EC, 1999).

4.2 Above-Grade Facility Demolition

Facility above-grade hazardous materials abatement and demolition work were completed at the Site in November 2006 by Pechiney under the direction of the City of Vernon H&EC. The work included removal and recycling or disposal of all above-ground building structures. The concrete building slabs (including those impacted by PCBs) and surrounding pavements were not removed during the above-grade demolition work. Additional testing of the concrete slabs for PCB has been conducted and was summarized earlier in Sections 3.2.3 and 3.5. These features remain in-place and will be removed as part of the below-grade demolition work described in this RAP. A summary of the above-grade demolition work is included in the Above Grade Demolition Completion Report dated December 26, 2006 (Geomatrix, 2006d).

5.0 SUMMARY OF SITE RISKS AND SITE-SPECIFIC REMEDIATION GOALS

As part of the FS for the Site (AMEC, 2012a), and pursuant to NCP 40 CFR 300.430(d)(1) and DTSC guidance and policy, AMEC conducted a screening-level HHRA to evaluate the potential human health risks associated with exposures to COPCs at the Site. This screening-level HHRA was conducted for individual “Phase areas” at the Site (Phase I through Phase VI), that were developed to facilitate future below-grade demolition work and the anticipated plans for future Site use(s); which may include the construction and operation of a power plant and/or commercial/industrial facilities. Based on the results of the screening-level HHRA, COCs were identified, and Site-specific risk-based and other remediation goals (collectively referred to herein as Site-specific remediation goals) were proposed to address COC concentrations (AMEC, 2012a). The HHRA, identification of COCs, and development of Site-specific remediation goals are summarized in this section.

5.1 Exposure Populations and Pathways

Potential risks were evaluated for human receptors under current and hypothetical future land use scenarios. Ecological receptors were not evaluated because the Site and surrounding areas are highly industrialized, providing poor quality habitat for such receptors. Furthermore, U.S. Fish and Wildlife Service determined the Site was not located within the vicinity of any federally listed species, their designated critical habitat, or other Federal trust resources under their jurisdiction (February 1, 2010, email communication with William B. Miller of the U.S. Fish and Wildlife Service).

Human receptors were identified based on anticipated plans for future Site use(s); there is no current use of the Vernon Facility. Because the property is being purchased by the City of Vernon for commercial/industrial use, potential future receptors at the Site include outdoor or indoor commercial/industrial workers and construction workers involved in future construction and grading work at the Site. The construction worker receptor is assumed to spend 100 percent of his time outdoors and addresses potential exposure of future short-term utility maintenance workers. No other land use (i.e., residential) is reasonably anticipated for the Site given that a land use covenant is proposed to be issued for the property restricting zoning and use of the Site to commercial/industrial purposes. Furthermore, the City of Vernon zoning laws prohibit new residential development within the City of Vernon. Commercial/industrial workers at the adjacent or nearby facilities and short-term utility maintenance workers were considered potential off-site receptors.

On-Site, the exposure pathways considered potentially complete for COPCs in soil for both outdoor commercial/industrial workers and construction workers and evaluated in the HHRA include:

- incidental ingestion of soil;
- dermal contact with soil;
- inhalation of soil particulates in ambient air; and
- inhalation of VOCs in ambient air (released from soil, soil vapor, or groundwater).

For the soil pathways, exposure was only considered potentially complete for the upper 15 feet of soil. Exposure also was considered potentially complete for the soil pathways to PCBs in concrete, because on-Site concrete may be crushed and reused as fill soil in excavations and foundation removal areas. Finally, exposure also was considered potentially complete for the volatile COPCs in soil, soil vapor, or groundwater via inhalation of these compounds in ambient air for outdoor commercial/industrial workers and construction workers and via inhalation of these compounds in indoor air for indoor commercial/industrial workers. Because soil vapor data are considered to be more appropriate than soil data for evaluating potential vapor exposure, soil vapor samples collected in each Phase area of the Site (except for the Phase VI area where VOCs were not detected in soil) were used instead of soil data to evaluate potential vapor movement to air and inhalation exposure. Potential vapor movement of VOCs in groundwater to indoor air was evaluated separately to differentiate vadose zone from groundwater impacts.

On-Site use of groundwater found in the first water-bearing unit (interpreted to be the upper portion of the Exposition aquifer) will be restricted as part of the land use covenant to be issued for the Site. Although groundwater from the first water-bearing unit is not currently used on- or off-site for potable supply (according to the City of Vernon H&EC, groundwater is produced off-site from the Jefferson, Lynwood, Silverado, and Sunnyside aquifers from depths of approximately 450 to 1400 feet bgs), the RWQCB Basin Plan (RWQCB, 1994) designated groundwater in the Site vicinity for beneficial use. Therefore, potential exposure to impacted Site groundwater found in the upper portion of the Exposition aquifer was evaluated. Furthermore, the potential threat of COPC movement from soil or concrete to groundwater was also evaluated.

Off-site exposure to COPCs in on-Site soil was considered potentially complete for outdoor commercial/industrial workers and utility maintenance workers through inhalation of particulates and VOCs in ambient air. Exposure may also be potentially complete for off-site indoor commercial/industrial workers to VOCs moving from on-Site groundwater or soil vapor into off-site indoor air. However, for COPCs detected in on-Site soil, soil vapor, or groundwater, the evaluation of on-Site exposures was assumed to be protective of off-site exposures. Potential off-site exposure to Site-related COPCs in soil vapor at the intersection of Fruitland and Boyle Avenues was evaluated separately.

5.2 RISK EVALUATION

Potential human health risks were evaluated using risk-based screening levels (RBSLs) developed using the methodology presented by the Office of Environmental Health Hazard Assessment (OEHHA) for California Human Health Screening Levels (OEHHA, 2005), and exposure parameters recommended by the DTSC (DTSC, 2005), as well as other recent OEHHA and DTSC guidance documents (OEHHA, 2009; DTSC, 2009). Potential use of groundwater was evaluated using available State or Federal MCLs instead of RBSLs.

Risks from exposure to COPCs in soil and soil vapor were evaluated independently for each Phase area by comparing maximum chemical concentrations to the RBSLs. Potential vapor intrusion risks from VOCs in groundwater were evaluated for the entire Site by comparing Site-wide maximum chemical concentrations in groundwater to RBSLs. Predicted lifetime excess cancer risks and non-cancer hazard quotients (HQs) were calculated from the ratios of concentrations to RBSLs, with cumulative effects from exposure to multiple chemicals evaluated by summing the chemical-specific cancer risks or HQs by exposure medium, and then summing across all media.

Potential exposure to PCBs in crushed concrete and COPCs (TCE and PCE) in off-site soil vapor, and the potential use of groundwater were evaluated separately. Potential exposure to PCBs in crushed concrete was evaluated for each Phase area by comparing maximum concrete concentrations to the RBSLs for soil. Potential exposure to TCE and PCE in off-site soil vapor (at the intersection of Fruitland and Boyle Avenues) was evaluated by comparing detected soil vapor concentrations to the indoor commercial/industrial worker RBSLs. Finally, the potential use of groundwater was evaluated by comparing Site-wide maximum detected concentrations in groundwater samples from the first water-bearing unit to MCLs. In addition, potential impacts to groundwater from COPCs in soil and concrete (i.e., through leaching) were evaluated by comparing detected concentrations in soil to RWQCB or U.S. EPA Region IX groundwater protection criteria, and then developing Site-specific screening levels for the COPCs above these criteria or for which the initial screening levels were not available.

The screening-level HHRA resulted in the following predicted lifetime excess cancer risks and noncancer hazard indices (HIs; the sum of chemical- and medium-specific HQs) for indoor commercial/industrial worker, outdoor commercial/industrial worker, and construction worker exposure to COPCs in soil and soil vapor in the upper 15 feet of the vadose zone.

Summary of Maximum Predicted Lifetime Excess Cancer Risks and Noncancer Hazard Indexes Cumulative Soil and Soil Vapor Exposure						
	Cancer Risks			Noncancer His		
Area	Indoor C/I[1] Worker	Outdoor C/I Worker	Construction Worker	Indoor C/I Worker	Outdoor C/I Worker	Construction Worker
Phase I	**4E-04**	**2E-03**	**3E-04**	**2**	0.02	0.2
Phase II	6E-07	**4E-03**	**6E-04**	0.004	**3**	**10**
Phase IIIa	--[2]	**1E-04**	**2E-05**	--[2]	1	**7**
Phase IIIb	3E-07	3E-07	5E-08	**53**	1	**4**
Phase IV	3E-07	**1E-04**	**2E-05**	**38**	**2**	**18**
Phase V	1E-07	5E-10	2E-08	0.002	0.003	0.03
Phase VI	--[2]	**6E-05**	**1E-05**	--[2]	0.4	**5**

Notes:

Cancer risks and HIs above DTSC points of departure (a cumulative lifetime excess cancer risk of 1 x 10^{-6}; an HI of 1) are **bold**.

1. Commercial/Industrial (C/I)
2. No VOCs were detected in soil or soil vapor in the Phase IIIa or Phase VI areas.

As presented in the table above, for cumulative soil and soil vapor exposures, the predicted lifetime excess cancer risks for the indoor commercial/industrial worker in the Phase I area; and the outdoor commercial/industrial worker and construction worker in the Phase I, Phase II, Phase IIIa, Phase IV, and Phase VI areas are above the DTSC point of departure (1 x 10^{-6}). The other cancer risks estimated were below 1 x 10^{-6}. The maximum predicted noncancer HIs for the indoor commercial/industrial worker in the Phase I, Phase IIIb, and Phase IV areas; the outdoor commercial/industrial worker in the Phase II and Phase IV areas; and the construction worker in the Phase II, Phase IIIa, Phase IIIb, Phase IV, and Phase VI areas are above the DTSC point of departure for noncarcinogenic effects (less than or equal to 1). The other HIs estimated for cumulative soil and soil vapor exposures were all at or below 1, with the majority being well below 1. In summary, maximum concentrations of chemicals resulted in risks or hazard indexes above target levels in the Phase I, Phase II, Phase IIIa, Phase IIIb, Phase IV, and Phase VI areas for one or more receptors.

The results of the independent screening of PCBs in concrete, TCE, and PCE in off-site soil vapor, and COPCs in site groundwater are summarized as follows.

Aroclors: Detected concentrations of Aroclor-1248, -1254, and -1260 in concrete were found to exceed RBSLs in the Phase I, Phase II, and/or Phase IV areas. The maximum detected concentrations by Phase Area relative to RBSLs are presented in the table on the next page.

Area		Maximum Detected Concentrations of Aroclor Mixtures in Concrete (mg/kg)			
		Aroclor-1016	Aroclor-1248	Aroclor-1254	Aroclor-1260
Phase I		ND[1]	**390**	**5.8**	**200**
Phase II		0.026	**3,300**	0.26	**5**
Phase IIIa		ND	0.1	ND	ND
Phase IV		0.32	0.4	**1**	0.28
RBSLs (mg/kg)					
Outdoor Commercial/ Industrial Worker	Cancer-Based RBSL	0.53	0.53	0.53	0.53
	Noncancer-Based RBSL	26	NA[2]	7.5	NA
Construction Worker	Cancer-Based RBSL	3.5	3.5	3.5	3.5
	Noncancer-Based RBSL	**6.9**	NA	2	NA

Notes:

Maximum detected concentrations that exceed at least one RBSL are bold.

1. Not detected (ND).
2. Not applicable (NA)

As presented, the maximum detected concentrations of Aroclor-1248, -1254, and -1260 in the Phase I area were found to exceed the outdoor commercial/industrial worker and construction worker cancer-based RBSLs (0.53 and 3.5 mg/kg, respectively), with the maximum detected concentration of Aroclor-1254 also found to exceed the construction worker noncancer-based RBSL (2.0 mg/kg). In the Phase II Area, the maximum detected concentrations of Aroclor-1248 and -1260 were found to exceed the outdoor commercial/industrial worker and construction worker cancer-based RBSLs (0.53 and 3.5 mg/kg, respectively). Finally, in the Phase IV Area, the maximum detected concentration of Aroclor-1254 was found to exceed the outdoor commercial/industrial worker cancer-based RBSL (0.53 mg/kg).

PCE and TCE on off-Site Soil Vapor: Detected concentrations of PCE and TCE in off-site soil vapor were found to exceed the indoor commercial/industrial worker cancer-based RBSLs (2.2 µg/L and 6.3 µg/L, respectively).

Groundwater: Site-wide, maximum detected concentrations of benzene, chloroform, 1,2-DCA, dichloromethane, and TCE in Site groundwater were found to exceed their respective MCLs.

5.3 IDENTIFICATION OF COCS

The COPCs in soil or soil vapor that individually contributed cancer risk levels of at least 1×10^{-6} or HQs of at least 1 in the human health exposure evaluation and were identified as COCs include:

- PCB mixtures Aroclor-1232, Aroclor-1248, Aroclor-1254, and Aroclor-1260 in soil;
- arsenic in soil;
- TPH as c6-c10 hydrocarbons in soil; and
- chloroform, PCE, TCE, TPH as Stoddard solvent, 1,2,4-trimethylbenzene (1,2,4-TMB), and 1,3,5 trimethylbenzene (1,3,5-TMB) in soil vapor.

With concentrations of Aroclor-1248, Aroclor-1254, and Aroclor-1260 in concrete in the Phase I, Phase II, and Phase IV areas exceeding RBSLs, these PCB mixtures were also identified as COCs in concrete. Additional COPCs in soil were identified as exceeding the Site-specific soil screening levels for the protection of groundwater and were thus identified as COCs: the BTEX compounds, 1,2 DCA, PCE, TCE, TPH as specific carbon ranges (c5-c10, c6-c10, c7-c12, c10-c20, c10-c28, and c21-c28), and TPH as Stoddard solvent. Finally, the COPCs in groundwater that exceeded their respective MCLs were identified as COCs: benzene, chloroform, 1,2-DCA, dichloromethane (i.e., methylene chloride), and TCE. With the exception of dichloromethane, these COCs were detected in groundwater as recent as 2006. No additional COPCs in groundwater were identified as COCs based on the screening of Site-wide maximum detected groundwater concentrations against vapor intrusion RBSLs. The potential lifetime excess cancer risk from vapor intrusion of VOCs in groundwater was above the DTSC point of departure (1×10^{-6}), but below the cumulative target cancer risk level of 1×10^{-5} proposed for the Site as described in Section 5.4 below. The noncancer HI from vapor intrusion of VOCs in groundwater was below the DTSC point of departure for noncarcinogenic effects (an HI less than or equal to 1).

5.4 SUMMARY OF SITE-SPECIFIC REMEDIATION GOALS

Site-specific remediation goals were established for COCs in soil vapor, soil, and concrete at the Site under future commercial/industrial land use scenarios. Development of these Site-specific remediation goals is described in detail in Section 5.2 of the FS (AMEC, 2012a). Remediation goals derived to be protective of potential human health risks were developed using 1 x 10^{-5} as a cumulative target cancer risk level and 1 as a cumulative target noncancer HI. Both targets were set as "acceptable" levels for cumulative chemical exposure related to commercial/industrial re-use of the Site with the issuance of a land use covenant, in coordination with the U.S. EPA risk management team responsible for approval of the risk-based application for PCBs and DTSC during a conference call on April 27, 2010. The resulting Site-specific remediation goals, with explanations provided for how each value was established, are provided in Tables 1A, 1B, and 1C. In summary, the Site-specific remediation goals are as follows:

Remediation Goals Established for COCs in Shallow Soil Vapor – for potential future commercial/industrial indoor air exposure (Table 1A).

1. VOCs in shallow soil vapor (at 5 and 15 feet bgs):
   - chloroform – **6.7 µg/L**;
   - PCE – **7.3 µg/L**;
   - TCE – **21 µg/L**;
   - TPH as Stoddard solvent – **500 µg/L**;
   - 1,2,4-TMB – **12.3 µg/L**; and
   - 1,3,5-TMB – **10.7 µg/L**.

Remediation Goals Established for COCs in Soil and Concrete – for future commercial/industrial use scenarios (Table 1B).

1. PCBs in Shallow Soil (0 to 15 feet bgs):
   - Aroclor-1254 – **2.0 mg/kg**;
   - Total Aroclors – **3.5 mg/kg** for soil that may be left exposed at the surface (0 to 5 feet bgs); and
   - Total Aroclors – **23 mg/kg** for subsurface soil (5 to 15 feet bgs) that only construction workers may come into contact with during excavation, grading, etc. (and that would remain at 5 to 15 feet bgs).
2. PCBs in Concrete:
   - Total Aroclors – **3.5 mg/kg**.
3. Metals in Shallow Soil (0 to 15 feet bgs):

- Arsenic – **10 mg/kg**.

4. TPH in Shallow and Deeper Soil (surface to groundwater, at approximately 150 feet bgs):

   - c5-c10 hydrocarbons, c6-c10 hydrocarbons, c7-c12 hydrocarbons, and TPH as Stoddard solvent – **500 mg/kg** (gasoline range hydrocarbons);
   - c10-c20 hydrocarbons and c10-c28 hydrocarbons – **1,000 mg/kg** (diesel range hydrocarbons); and
   - c21-c28 hydrocarbons – **10,000 mg/kg** (residual fuel range hydrocarbons).

VOCs in Shallow and Deeper Soil (surface to groundwater, at approximately 150 feet bgs) – depth-specific remediation goals for TCE, PCE, BTEX, and 1,2-DCA are presented in Table 1C.

Boring or sample locations with matrix sample concentrations above the Site-specific remediation goals are shown on Figure 9 of the FS (AMEC, 2012a).

Remediation goals were not established for the COCs identified in groundwater. A monitored natural attenuation (MNA) remedial approach will be applied to groundwater at the Site. As required by DTSC, an additional groundwater monitoring well will be installed in the northwest corner of the Site to support the MNA approach. The MNA approach is proposed for the Site for the following reasons:

- presence of low concentrations of chlorinated VOCs, with the concentration of TCE ranging between 3 μg/L and 420 μg/L in groundwater samples collected beneath the Site;
- depth at which groundwater was observed (about 150 feet bgs) limits potential exposure to TCE and other VOCs by inhalation through potential vapor intrusion or dermal contact with groundwater;
- observed reduction (attenuation) in chlorinated VOC concentrations in groundwater samples collected in the southern portion of the Site since 1991 (wells AOW-3, AOW-7, AOW-8 and AOW-9);
- remediation proposed for an on-Site source of chlorinated VOCs in the northwestern portion of the Site (source removal);
- the presence of other source(s) of TCE and other VOCs in groundwater in the Site vicinity (regional impacts); and

- issuance of a land use covenant to restrict the use of on-Site groundwater within the first water-bearing unit.

6.0 EVALUATION OF ALTERNATIVES

The following technologies were retained in the FS and further considered and evaluated in detail:

- no action;
- excavation and off-site landfill disposal for surface and shallow COC-impacted soil and deep VOC-impacted soil;
- in situ stabilization of shallow metals-, Stoddard solvent-, and PCB-impacted soil;
- SVE for shallow and deep VOC-impacted soil;
- SVE and bioventing for shallow and deep Stoddard solvent-impacted soil; and
- demolition and disposal of PCB-impacted concrete.

These technologies were combined in the FS into potential alternatives for mitigating COC-impacted areas at the Site and are further evaluated in Section 6.2.

6.1 EVALUATION PROCESS

The Health and Safety Code section 25356.1(d) requires that remedy evaluations be based on requirements contained within the NCP 40 CFR 300.430. The NCP identifies evaluation criteria (also known as balancing or evaluation criteria) to be used in the development and scoping of remedial alternatives to provide a basis for comparison using additional, more detailed criteria, referred to as evaluation criteria. The criteria include those developed by the U.S. EPA in the NCP 40 CFR 300.430(a)(1)(iii) as modified by the State of California. All nine balancing criteria are used in this RAP (Threshold Criteria, Primary Balancing Criteria, and Modifying Criteria). These criteria are further described below.

6.1.1 Evaluation Criteria

NCP-based evaluation criteria are described below.

- <u>Overall protection of human health and the environment</u> [40 CFR 300.430(e)(9)(iii)(A)]: Evaluates if the alternative provides adequate protection and if the risks posed through each pathway are controlled, reduced or eliminated; and how the remedy achieves, maintains, or supports protection of human health and the environment.

- Compliance with State and Federal requirements [40 CFR 300.430(e)(9)(iii)(B)]: Evaluates how the alternative complies with applicable federal/state/local requirements and guidelines.
- Long-term Effectiveness [40 CFR 300.430(e)(9)(iii)(C)]: Refers to the ability of the alternative to maintain long-term reliable protection of human health and the environment over time, after remediation goals have been met, and identify the conditions that may remain at the Site after the remedy objectives have been met. Evaluation of the alternatives will also include factors such as treatment residuals.
- Reduction of Toxicity, Mobility, or Volume through Treatment [40 CFR 300.430(e)(9)(iii)(D)]: An evaluation of alternatives using this criterion will define the anticipated performance of the specific treatment technology. Refers to the ability of the remedy to reduce the toxicity, mobility and volume of COCs, the type and quantity of treatment residuals that will remain, and the degree to which the treatment will be irreversible.
- Cost [40 CFR 300.430(e)(9)(iii)(G)]: This assessment will evaluate the capital and operation and maintenance (O&M) costs for each alternative. The cost estimates will be assessed as capital cost, annual O&M cost, and present worth analysis.
- Short-term effectiveness [40 CFR 300.430(e)(9)(iii)(E)]: Evaluates the period of time necessary to implement the remedy, and identifies any adverse impact on the community, protection of workers, and potential environmental impacts that may arise during the implementation of the remedy, until the remediation goals are met.
- Implementability [40 CFR 300.430(e)(9)(iii)(F)]: Refers to the technical and administrative feasibility of implementing an alternative. Factors to be considered include construction and operation, monitoring duration considerations, required permits, and availability of necessary services and materials.
- Regulatory Agency Acceptance [40 CFR 300.430(e)(9)(iii)(H)]: Indicates whether the applicable regulatory agencies, after their review of the information, are in agreement with the preferred alternative.
- Community Acceptance [40 CFR 300.430(e)(9)(iii)(I)]: Indicates whether or not the community has a preference with regard to the remedy and if their concerns are being met.

6.2 DESCRIPTION AND EVALUATION OF REMEDIAL ALTERNATIVES

This section describes the remedial alternatives that were retained from the evaluation performed in the FS to address each COC. These alternatives are described below and evaluated against the Evaluation Criteria presented in Section 6.1.1 and summarized in Table 2.

6.2.1 Alternative 1

No Action

Alternative 1 consists of “No Action” and is included for evaluation pursuant to NCP 40 CFR 300.430(e)(6) and retained for comparison purposes. No below-grade demolition or soil remediation would be performed. “No Action” is not a viable alternative.

6.2.2 Alternative 2

Excavation and Disposal of COC-Impacted Soil and Demolition and Disposal of PCB Impacted Concrete

Alternative 2 consists of excavation and off-site disposal of shallow and deep COC-impacted soil (metals, PCBs, Stoddard solvent, and VOCs) to depths of approximately 8 feet bgs for metals, 12 feet bgs for PCBs, and 45 to 50 feet bgs for VOCs and Stoddard solvent, respectively. Excavation will require installation of shoring for sidewall stability and safety during soil removal. Vadose zone VOC remediation will promote a reduction in VOC concentrations in groundwater beneath the northern portion of the Site. This alternative also includes demolition and landfill disposal of concrete slab containing PCB concentrations greater than 3.5 mg/kg. In addition, PCB-impacted concrete (greater than 1.0 mg/kg and less than 3.5 mg/kg) would be crushed and deposited on-Site as restricted fill material (i.e., on-Site disposal) and covered with an interim cap consisting of a visual identifier layer and a minimum of 12-inches of clean crushed concrete (unrestricted fill material). Non-PCB-impacted concrete (less than or equal to 1.0 mg/kg) would be crushed and reused on-Site as unrestricted fill material. A land use covenant that incorporates an operation and maintenance (O&M) plan and soil management plan (SMP) would also be included in this alternative.

6.2.3 Alternative 3

Excavation and Disposal of Shallow COC-Impacted Soil, SVE for Shallow and Deep VOC-Impacted Soil, SVE and Bioventing for Shallow and Deep Stoddard Solvent-Impacted Soil, and Demolition and Disposal of PCB-Impacted Concrete

Alternative 3 consists of excavation and off-site disposal of shallow COC-impacted soil (PCBs and metals) to depths of approximately 15 feet bgs. Shallow (up to 50 feet bgs) and deep (up to 90 feet bgs) VOC-impacted soil would be mitigated using SVE. Shallow (up to 50 feet bgs) Stoddard solvent-impacted soil would be mitigated using sequential treatment consisting initially of SVE, followed by longer term bioventing. Vadose zone VOC remediation will promote a reduction in VOC concentrations in groundwater beneath the northern portion of the Site. Deeper soils (at depths greater than 15 feet) impacted with PCBs above the remediation goal would be left in place and covered with a physical barrier at depth. The physical barrier would consist of 6-inches of cement concrete. This alternative also includes demolition and landfill disposal of PCB-impacted concrete slabs with PCB concentrations greater than 3.5 mg/kg. In addition, PCB-impacted concrete (greater than 1.0 mg/kg and less than 3.5 mg/kg) would be crushed and deposited on-Site as restricted fill material (i.e., on-Site disposal) and covered with an interim cap consisting of a visual identifier layer and a minimum of 12-inches of cleans crushed concrete (unrestricted fill material). Non-PCB-impacted concrete (less than or equal to 1.0 mg/kg) would be crushed and reused on-Site as unrestricted fill material. A land use covenant that incorporates an O&M plan and SMP would also be included in this alternative.

6.2.4 Alternative 4

In Situ Stabilization of Shallow PCB/Metals-Impacted Soil and Deep Stoddard Solvent-Impacted Soil, SVE for Shallow and Deep VOC-Impacted Soil, and Demolition and Disposal of PCB-Impacted Concrete

Alternative 4 consists of in situ stabilization (ISS) of shallow PCB- and metals-impacted soil and deep Stoddard solvent-impacted soil, using a cement-based additive to depths of approximately 15 feet bgs for PCB- and metals-impacted soil and approximately 50 feet for Stoddard solvent-impacted soil. Shallow (up to 50 feet bgs) and deep (up to 90 feet bgs) VOC-impacted soil would be mitigated using SVE. Vadose zone VOC remediation will promote a reduction in VOC concentrations in groundwater beneath the northern portion of the Site. This alternative also includes demolition and off-site disposal of concrete slabs containing PCB concentrations greater than 3.5 mg/kg. In addition, PCB-impacted concrete (greater than 1.0 mg/kg and less than 3.5 mg/kg) would be crushed and deposited on-Site as restricted fill material (i.e., on-Site disposal) and covered with an interim cap consisting of a visual identifier layer and a minimum of 12 inches of clean, crushed concrete (unrestricted fill material). Non-PCB-impacted concrete (less than or equal to 1.0 mg/kg) would be crushed and reused on-Site as unrestricted fill material. A land use covenant that incorporates an O&M plan and SMP would also be included in this alternative.

6.3 Summary Analysis of Alternatives against the Nine Criteria

The four alternatives are analyzed below using the nine evaluation criteria.

6.3.1 Overall Protection of Human Health and the Environment

All of the alternatives, with the exception of the “No Action” alternative, meet this criterion by mitigating shallow COC-impacted soils and PCB-impacted concrete containing COC concentrations above the Site-specific remediation goals, and eliminating source areas that could potentially impact groundwater.

6.3.2 Compliance with Applicable Requirements

All of the alternatives, with the exception of the “No Action” alternative, meet this criterion. Because the “No Action” alternative would not be protective of human health and the environment and would not meet the remediation goals for the Site, Alternative 1 will not be discussed further in the criteria analysis below.

6.3.3 Long-Term Effectiveness and Permanence

All of the alternatives would eliminate human exposure pathways between future receptors and soil, soil vapor, recycled concrete, and airborne dust. In addition, the SVE with bioventing as included in Alternative 3 and SVE as included in Alternative 4, are considered presumptive remedies, are minimally invasive, and can achieve Site-specific remediation goals for shallow and deeper VOC- and Stoddard solvent-impacted soil. Remediation of the VOC-impacted soil in the northern portion of the Site will promote long-term natural attenuation of VOCs in groundwater.

6.3.4 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 2 and 3 would reduce the toxicity, mobility, and volume of COC-impacted soil and PCB-impacted concrete. Alternative 4 would reduce the toxicity, mobility, and volume of PCB-impacted concrete and deeper VOC- and Stoddard solvent-impacted soil. Alternative 4 would also reduce the mobility of shallow COC-impacted soils, but volume and toxicity would not be significantly reduced by ISS treatment.

6.3.5 Cost

Costs for the excavation components in Alternatives 2 and 3 were based on an excavation rate of 500 cubic yards per day and confirmation sample rate of one sample per 200 cubic yards of excavated material. Shoring costs are included in all proposed excavation areas greater than 10 feet. Waste management costs associated with landfill disposal of metals-, VOCs-, and Stoddard solvent-impacted soils were estimated assuming that 90 percent of the waste is classified as a non-hazardous waste and 10 percent of the waste is classified as a hazardous waste. Waste management costs associated with landfill disposal of PCB impacted soils were estimated assuming that 30 percent of the soil waste is classified as a non-TSCA waste and 70 percent of the soil waste is classified as a TSCA waste. Average thickness of the PCB-impacted concrete slabs was assumed to be 12 inches.

Costs for SVE for VOC-impacted soil in Alternatives 3 and 4 were based on rental of a minimum 1,000 cubic feet per minute (cfm) South Coast Air Quality Management District (SCAQMD)-permitted system operating for over a three year period. Bioventing costs for the Stoddard solvent impacted soil under Alternative 3 include operation of a SVE system for the first 3 months of a three-year period followed by operation of a pulsed air injection system over a the remainder of the three-year period.

Costs for soil stabilization in Alternative 4 are based on a stabilization rate of 300 cubic yards per day, maximum stabilization depth of 50 feet bgs, and a stockpile confirmation sample rate of one sample per 200 cubic yards. Cement-mixing-additives are assumed to be 10 percent of the stabilization material for cost estimating purposes. Cost assumes 20 percent of the mixed volume requires off-site disposal. Waste management costs associated with landfill disposal were estimated assuming that 90 percent of the waste would be classified as a non-hazardous waste and 10 percent of the waste would be classified as a hazardous waste. Estimated total capital cost for Alternatives 2, 3 and 4 are summarized in Table 2 and additional cost detail is provided in Appendix A.

6.3.6 Short-Term Effectiveness

All of the alternatives will reduce risk to receptors and the environment if appropriate personal protective equipment (PPE) is worn by Site workers; and if dust, noise and odor controls are implemented. Alternative 2 would have the greatest short-term impacts on the community and the workers due to potential air emissions produced during large-scale excavation activities. Alternatives 3 and 4 would have the least short-term impacts (with Alternative 3 being the least) on Site workers because deeper soil impacts would be mitigated using less invasive in situ remedial technologies.

6.3.7 Implementability

The technologies employed in Alternatives 2, 3 and 4 are reliable and have proven effective in previous field applications. Implementation is relatively straightforward using commercially available materials and equipment.

Additionally, the SVE and bioventing technologies associated with Alternatives 3 and 4 are considered presumptive remedies and have been demonstrated as effective on numerous other sites impacted by organic COCs similar to those present at the Site. Previous Site-specific bench-scale treatability studies performed by Alcoa also demonstrated that the Stoddard solvent-impacted soils are amenable to bioventing as contained in Alternative 3. SCAQMD permits must be obtained for operation of the SVE systems for both VOC- and Stoddard solvent-impacted soils along with a monitoring and reporting program after system start-up.

Soil stabilization as described in Alternative 4 requires a bench-scale mix design test and mobilization of a crawler-mounted large diameter auger drilling rig. Shoring or other slope stability controls are required for all remedy components that include soil excavations greater than four feet deep.

7.0 PREFERRED REMEDIAL ALTERNATIVE

Alternative 3, which consists of excavation and disposal of shallow COC-impacted soil, SVE for shallow and deep VOC-impacted soil, SVE and bioventing for shallow and deep Stoddard solvent-impacted soil, and demolition and disposal of PCB-impacted concrete, is the preferred remedial alternative described in Section 6.2.3. Alternative 3 is selected because it satisfies the balancing criteria discussed above, as required by Health and Safety Code section 25356.1(d) and the NCP, and will not require extensive soil excavation and off-site disposal. Alternative 3 is preferred to Alternative 4 because Alternative 3 will reduce the toxicity, mobility, and volume of COC-impacted soil to a greater extent than Alternative 4. Alternative 3 consists of soil excavation and disposal and SVE and bioventing in a balanced mitigation strategy that is the most cost-effective, is minimally invasive, and is protective of human health and the environment. In addition, remediation of VOC-impacted soil will promote long-term natural attenuation of VOCs in groundwater. Implementation of the remediation components associated with Alternative 3 is described below.

7.1 PCB-IMPACTED CONCRETE REMEDIAL ACTION IMPLEMENTATION

The preferred remedial approach for PCB-impacted concrete is demolition and disposal at an off-site landfill facility. This portion of the remedy will be implemented in conjunction with below-grade demolition of surface slabs and pavements. Based on the results of the screening HHRA and attenuation modeling for protection of groundwater, a Site-specific PCB remediation goal of 3.5 mg/kg has been proposed to be applied as the crushed concrete reuse criterion (on-Site disposal). Concrete that exceeds the remediation goal cannot be reused on-site and will be removed and disposed off-site during below-grade demolition to off-site landfill facilities designated to receive TSCA-regulated PCB-containing wastes. Concrete slabs with PCB concentrations greater than 1 mg/kg and less than 3.5 mg/kg will be crushed on-Site and deposited on-Site with restrictions as excavation backfill. This material will be placed in a localized area (former Building 104) at depths greater than 5 feet bgs, demarcated with a visual identifier layer, then covered with crushed concrete containing less than 1 mg/kg of PCBs (interim cap), as required by U.S. EPA. Concrete slabs with PCB concentrations less than or equal to 1 mg/kg will be crushed on-Site and reused without restriction at the Site as fill during grading activities. Figure 4 shows concrete sampling concentrations and locations, and defines areas where PCB concentrations in concrete exceed 1 mg/kg, 3.5 mg/kg, and 50 mg/kg.

7.1.1 Site Preparation

PCB-impacted concrete will be demarcated at the Site by painting a “cut line” on the slab to identify those areas previously delineated by slab coring and laboratory analytical testing. The cut lines will encircle areas previously identified to contain PCB concentrations greater than 1.0 mg/kg, greater than 3.5 mg/kg, and greater than 50 mg/kg (Figure 4).

7.1.2 Slab Removal and Stockpiling

Slabs will be saw-cut or broken along demarcation lines to facilitate removal using construction equipment. PCB-impacted slabs will be removed, sized for handling, and either temporarily stockpiled on-Site in separate piles or bins based on concentrations prior to disposal, or direct-loaded into hauling trucks for landfill disposal. All PCB-impacted concrete wastes slated for landfill disposal will be shipped off-site within 30 days of generation pursuant to 40 CFR 761.65(c)(1).

Slab areas where PCB concentrations exceed 50 mg/kg will be direct-loaded into bins or hauling trucks for off-site landfill disposal as a TSCA PCB hazardous waste. Concrete containing PCBs with concentrations greater than 3.5 mg/kg will be direct-loaded for off-site landfill disposal as a TSCA, bulk PCB remediation waste. Concrete with PCB concentrations greater than 1 mg/kg but less than 3.5 mg/kg (restricted use fill) will either be removed and stockpiled on-Site pursuant to 40 CFR 761.65(c)9 prior to crushing and reuse as restricted fill; or removed and placed directly into an excavation as restricted fill.

In areas with PCB-impacted concrete, the concrete slabs will be observed during removal for multiple layers of concrete and visible staining. Concrete slabs or below-grade structures exhibiting visual signs of staining will be segregated for sampling and analysis for PCBs. During periods of inactivity, PCB-impacted concrete stockpiles will be covered to control dispersal of material via wind or runoff pursuant to 40 CFR 761.65(c)9. Contractor stockpiling activities will be performed pursuant to Section 02114 of the Below Grade Demolition and Soil Excavation Technical Specifications (Technical Specifications) (Appendix B).

Perimeter air monitoring will be conducted during slab removal and stockpiling as described in Section 7.2.4.

7.1.3 Soil Sampling Beneath PCB-Impacted Concrete

In areas where soil verification and characterization data does not already exist beneath newly identified PCB-impacted concrete slabs with PCB concentrations above 3.5 mg/kg, additional in situ soil characterization samples will be collected after slab removal is complete to determine the concentration at which PCBs may be present. The frequency by which these soil samples will be collected will be selected in the field using the sampling frequency provided below.

Concrete Slab Areas (in feet)	Grid Spacing	Additional Samples	Estimated Number of Samples
Horizontal dimensions up to approximately 10 by 10 feet	None	− 1 soil sample at the center of the exposed soil area, or directly beneath the location where the concrete core sample exhibited the highest PCB concentration	1
Horizontal dimensions up to approximately 20 by 20 feet	Grid divided into 2 equal parts	− 2 samples; one from the center of each grid part − 1 sample; directly beneath the location where the concrete core sample exhibited the highest PCB concentration	3
Horizontal dimensions up to approximately 50 by 50 feet	Grid divided into 4 equal parts	− 4 samples; one from the center of each grid part − 1 sample; directly beneath the location where the concrete core sample exhibited the highest PCB concentration	5

The actual number of confirmation soil samples collected from beneath the PCB-impacted slabs will be selected in the field based on the size of the area and the location of adjacent footings and below-grade structures. These confirmation samples will be collected using the procedures described in Appendix B of the Quality Assurance Project Plan (QAPP) (Geomatrix, 2007), and the SAP (AMEC, 2010).

Additional PCB-impacted soil found at concentrations above the Site-specific remediation goals for soil (at depth between 0 and 15 feet bgs) will be removed and verification sampling will be implemented as described in Section 7.2.7.

7.1.4 Concrete Profiling, Transportation, and Disposal

Concrete characterization data or additional concrete sampling data collected prior to or during below-grade demolition will be used to create a waste disposal profile at a facility permitted to receive PCB-impacted wastes. The appropriate TSCA notification of PCB activity will be filed with the U.S. EPA, as required.

Concrete containing total PCBs greater than 1 mg/kg are considered bulk PCB remediation waste. Concrete with total PCBs greater than 1 mg/kg but less than 3.5 mg/kg (concrete remediation goal) will be disposed on-Site as restricted fill in selected deeper soil excavation areas (greater than 5 feet bgs) then covered with an interim cap pursuant to Section 2110 of the Technical Specifications (Appendix B). Concrete containing total PCBs less than 1 mg/kg will be used as unrestricted fill on-Site during backfilling and grading activities.

Porous surfaces impacted with PCBs greater than 1 mg/kg, including asphalt and certain piping made of or coated with porous material shall be disposed of in accordance with 40 CFR 761.61.(a)(5)(i). Concrete containing PCBs at concentrations that exceed risk-based remediation goals (greater than 3.5 mg/kg) will also be disposed of in accordance with 40 CFR 761.61.(a)(5)(i). Any non-porous materials such as metal piping impacted with PCBs greater than 1 mg/kg, that are removed during demolition of slabs and below-grade structures, are also considered PCB remediation waste, and shall be disposed of in accordance with 40 CFR 761.61(a)(5)(i)(B)(2)(ii) and 761.61(a)(5)(i)(B)(2)(iii).

After impacted concrete and other bulk PCB remediation wastes are profiled, they will then be removed and loaded into trucks for transportation to an off-site landfill for disposal pursuant to Section 02120 of the Technical Specifications (Appendix B), and the Hazardous Materials Transportation Plan (AMEC, 2012b). All PCB-impacted concrete wastes slated for landfill disposal will be shipped off-site within 30 days of generation.

Each truck load will be covered with either a tarpaulin or plastic sheeting prior to departing the jobsite. Wastes shipped off-site in roll-off bins or containers will have closed tops. All truck exteriors will be inspected and cleaned of any loose soil or concrete debris that may be present on the truck exterior associated with loading activities. The contractor will take proper measures to prevent Site soil or debris from being tracked onto adjacent City right-of-ways during off-site shipment. Cleanup wastes, including non-liquid cleaning materials and PPE impacted with PCBs greater than 1 mg/kg, shall be disposed of as PCB remediation waste in accordance with 40 CFR 761.61(a)(5)(v). All loads will be properly manifested and placarded.

7.1.5 Decontamination of Equipment and Tools

Construction equipment and tools used during the removal and handling of PCB-impacted concrete and soil will be decontaminated prior to exiting the Site. Sampling equipment used during collection of confirmation or verification samples will be decontaminated prior to first use and between sampling locations (U.S. EPA, 2008).

Working surfaces that have contacted PCBs will be decontaminated with hexane using the double wash/rinse methods as defined in 40 CFR 761 Subpart S. Decontamination waste and residues will be collect, properly containerized and labeled, then disposed off-site in accordance with 40 CFR 761.60. The decontamination waste will be profiled for disposal pursuant to 40 CFR 761.79(g).

7.2 SURFACE/SHALLOW COC-IMPACTED SOIL REMEDIAL ACTION IMPLEMENTATION

The preferred remedial technology for surface and shallow COC-impacted soil is excavation and off-site landfill disposal. These remedial excavation areas are shown on Figure 7. This remedy will be implemented after below-grade demolition of surface slabs and pavements, utilities and pipelines, pits, sumps, and other deeper structures is complete.

7.2.1 Groundwater Wells and Monitoring

As required by DTSC, an additional groundwater monitoring well will be installed in the northwest corner of the Site to support the MNA groundwater approach. The newly installed groundwater monitoring well and the remaining three groundwater monitoring wells AOW-6, AOW-8, and AOW 9 (located in the Phase IIIb and Phase IV areas), will remain in place and protected during demolition. These wells will be used to obtain current groundwater flow direction information, and groundwater samples will be periodically monitored for VOCs and natural attenuation parameters. The proposed MNA monitoring program for the VOC-impacted groundwater in the northern portion of the Site is provided below.

- After the installation of the new groundwater monitoring well, the groundwater monitoring well will be surveyed and developed. Well development will be conducted using surge and bail methods. Field groundwater quality parameters (pH, temperature, specific electrical conductance [SEC], and turbidity) will be measured and recorded periodically to assess the progress of development. Development will continue until stabilization of field groundwater quality parameters, and when the water is relatively clear and free of suspended sediment. A minimum of three saturated well volumes (saturated screen plus filter pack void space) will be removed from the well during development.

- The new well along with three existing on-Site groundwater monitoring wells (AOW-6, AOW-8, and AOW-9) will be monitored on a quarterly basis for the first year. The frequency of monitoring events may be modified pending evaluation of data collected over several sampling events.

- Prior to purging and sampling, water levels will be measured in each groundwater monitoring well to evaluate the hydraulic gradient across the site.

- The groundwater monitoring well network will be purged using a submersible pump and sampled using a bailer. Field parameters including pH, SEC, temperature, dissolved oxygen (DO), oxidation reduction potential (ORP), and turbidity will be monitored during purging and sampling activities.

- Groundwater samples will be collected and analyzed for the following constituents to monitor and assess the viability of MNA:
    - VOCs using U. S. EPA Method 8260B;

  - calcium, magnesium, manganese, sodium, and potassium, using U.S. EPA Method 6010B;
  - Total Kjeldahl Nitrogen (as N) using Standard Method 4500-NH3 C;
  - ammonia (as N) using Standard Method 4500-NH3 D;
  - chloride using Standard Method 4500-Cl-C;
  - total alkalinity (as CaCO3) using Standard Method 2320B,total sulfide using Standard Method 4500S-D;
  - total phosphorus using Standard Method 4500 E;
  - dissolved iron using U.S. EPA Method 200.7;
  - iron (II) using Colorimetric Hach Method 8146;
  - methane, ethane, and ethene, using RSK-175M;
  - nitrate, nitrite, organo-phosphate, and sulfate, using U.S. EPA Method E300; and
  - total organic carbon using Standard Method Standard Method 5310B.

- Field quality assurance/quality control (QA/QC) samples including equipment rinsate blank, temperature blank, and trip blank samples used to assess field precision and accuracy will be collected at a frequency as described in the QAPP (Geomatrix, 2007).

- Laboratory QA/QC samples including laboratory duplicate samples, laboratory control samples, matrix spike/matrix spike duplicates used to assess laboratory precision and accuracy will be collected and prepared at a frequency described in the QAPP (Geomatrix, 2007).

After the initial testing is completed, a sampling schedule will be provided to DTSC for future sampling events.

In addition, if the MNA approach does not reduce the Site-derived TCE concentrations in groundwater then an alternative groundwater remedy may be considered in the future.

When required, the wells will be destroyed in accordance with applicable guidelines listed in the California Department of Water Resources Bulletin 74-81 and 74-90 upon completion of remediation of the Stoddard solvent-impacted soil and upon receipt of authorization from DTSC.

7.2.2 Site Preparation

Site preparation includes obtaining necessary permits, implementation of storm water and dust controls, and installation of excavation shoring prior to soil removal. These tasks are further described below.

7.2.3 Storm Water Controls

Storm Water Best Management Practices will be implemented and maintained around the excavation perimeter and soil stockpiling areas pursuant to Section 01502 of the Technical Specifications (Appendix B) and the Storm Water Pollution Prevention Plan (SWPPP) (AMEC & American Integrated Services, Inc., 2011).

7.2.4 Dust Controls and Perimeter Air Monitoring

Dust control measures will be implemented during soil excavation and handling (and concrete crushing activities) pursuant to Section 01501 of the Technical Specifications (Appendix B). The primary dust control measure will be the application of water sprays or mists. Site perimeter air monitoring will be conducted as described in the Revised Perimeter Air Monitoring Plan (AMEC, 2011b). The plan includes, among other things, a season-specific wind rose and a figure showing wind flow patterns in the vicinity of the Site in relation to neighboring communities. Air monitoring instruments will be located on the Site based on this information.

7.2.5 Shoring

Site preparation may require installation of shoring around the perimeter of each proposed excavation area greater than 10 feet deep pursuant to Section 02260 of the Technical Specifications (Appendix B). A Shoring Plan will be prepared by the contractor and submitted to the City for review and approval prior to actual shoring installation.

7.2.6 Excavation and Stockpiling

Soil will be excavated using a track-mounted excavator capable of removing soil to depths of greater than 15 feet bgs. Soil will be excavated to the lateral and vertical extent of known COC-impacts based on previous Site characterization sampling data. Excavated soil will be staged adjacent to the excavation and then transferred to a lined and bermed temporary stockpile located on-Site. Contractor soil stockpiling activities will be performed pursuant to Section 02114 of the Technical Specifications (Appendix B).

7.2.7 Confirmation and Verification Sampling and Waste Profiling

Confirmation soil sampling within open excavation areas will be conducted using the procedures described in Appendix B of the QAPP (Geomatrix, 2007). Verification samples will be collected from soil removal areas with PCB impacts. Verification samples will be collected in the same manner as the confirmation samples, and will adhere to the guidelines outlined in the SAP (AMEC, 2010).

Soil samples will also be collected from the temporary stockpile for waste profiling purposes to meet the acceptance criteria of the receiving facility, prior to off-site landfill disposal. Soil analytical testing will be performed to meet the waste profile requirements of the receiving facility.

7.2.8 Off-Site Disposal

COC-impacted soil will be loaded into trucks and shipped off-site for landfill disposal pursuant to Section 02120 of the Technical Specifications (Appendix B). Each truck will be covered with either a tarpaulin or plastic sheeting prior to departing the jobsite, and all truck exteriors will be inspected and cleaned of any loose soil that may be present on the truck exterior after loading. The contractor will take proper measures to prevent Site soil from being tracked onto adjacent City right-of-ways during off-site shipment. All loads will be properly manifested and placarded.

7.2.9 Backfilling and Grading

Excavation areas will be backfilled with crushed recycled aggregates obtained from on-Site crushing of concrete demolition debris (as unrestricted fill with PCB concentrations less than or equal to 1 mg/kg). Restricted fill with PCB concentrations greater than 1 mg/kg and less than or equal to 3.5 mg/kg will be used as backfill at a designated location on-Site as described in Section 7.1.2. Aggregates will be crushed to the gradations provided in Section 02050 of the Technical Specifications (Appendix B), and will be backfilled and compacted pursuant to Section 02351 of the Technical Specifications (Appendix B).

7.2.10 Schedule for Implementation

Excavation and off-site disposal of the COC-impacted soil will be performed by the contractor during the implementation of below-grade demolition and soil excavation work. Below-grade demolition work is anticipated to start after agency approval of the RAP and completion of the public participation activities. It is anticipated that the below-grade demolition and soil remediation work can be completed in approximately four to six months, excluding any potential weather-related delays.

7.3 Shallow and Deep VOC-Impacted Soil Remedial Action Implementation

The preferred remedial technology for shallow and deep VOC-impacted soil (containing TCE, PCE, and benzene) in the Phase I area is SVE. This remedy will be implemented upon completion of below-grade demolition associated with slab, foundation, footing, and other structure removal in the Phase I area at the Site. A network of SVE wells will be installed with well screen intervals both above and below the fine-grained soil unit present from approximately 50 to 70 feet bgs in the northern portion of the Site. SVE wells will be installed at the Site within the area of known impacts and at other locations where VOCs were detected in soil and soil vapor at concentrations exceeding the Site-specific remediation goals. Some of these SVE wells will be placed adjacent to the northwestern property boundary to facilitate coverage of the Site-derived soil vapor impacts observed directly adjacent to the Site on Fruitland Avenue as shown on Figures 8 and 9. Soil cuttings generated during well installation work will be contained as investigation-derived waste for profiling and off-site disposal. Specific details regarding the SVE system and associated remediation equipment are provided below.

7.3.1 Site Preparation

After completion of below-grade demolition and limited soil excavation work related to footings and foundations removal in the Phase I area, the area will be re-graded and compacted. The area will be topographically lower than previous Site conditions prior to foundation and soil removal. A four- to six-inch thick layer of crushed recycled aggregates, obtained from the on-Site crushing of clean concrete demolition debris, will be spread across the Phase I area to provide a suitable working surface during implementation of SVE.

A three-phase, 240-volt, 200-ampere temporary electrical power service panel will be installed on a temporary power pole in the northwest corner of the Site to obtain electricity from existing power lines located along Fruitland Avenue. The temporary power pole and electrical service panel will be required to operate the SVE system, and will be located inside the existing concrete perimeter wall near the intersection of Boyle and Fruitland Avenues.

7.3.2 Well Installation

SVE wells will be installed in the Phase I area at two specific depth intervals as presented below.

SVE Well Depth	Well Screen Interval (feet bgs)	Estimated Well Radius of Influence	Number of Wells
Surface to 50 feet bgs	40 to 50	60 to 75 feet	15
Surface to 90 feet bgs	80 to 90	85 to 100 feet	4

The approximate number of SVE wells proposed in the RAP was based on professional judgment and previous knowledge of radius of influence (ROI) values for similar types of lithologies observed at different sites. The shallow screen intervals are located at a depth that corresponds to the coarse-grained soils above the upper surface of the fine-grained unit observed at a depth of approximately 50 feet. This 10-foot screened interval was selected to target the upper vadose zone (between the depths of 5 to 50 feet) where impacted soil and soil vapor were observed with elevated VOC concentrations. The 10-foot screen will facilitate a larger ROI in both the horizontal and vertical directions. The deeper screen intervals are located near the approximate depths of deeper soil samples that contained elevated VOC concentrations. The top of the deeper screen interval (80 feet bgs) is approximately at the bottom of the fine-grained unit. Figures 8 and 9 provide the proposed SVE well locations, and Figure 10 contains a generalized construction diagram for the proposed SVE wells.

Prior to start-up, soil vapor samples will be collected from the SVE wells to establish baseline conditions. An evaluation of the effective area of influence will be performed at the Site after the proposed SVE well network is installed. Additional SVE wells may be added based on effective area of influence both above and below the fine-grained unit. Wellhead completions will consist of an above-ground flow-controlling ball valve and sample port for periodic soil vapor sampling and area of influence monitoring. Each SVE well will be constructed using Schedule 40 polyvinyl chloride (PVC) pipe with a 0.020-inch slot screen size, a sand filter pack surrounding the well screen, a bentonite seal, and a concrete surface seal (Figure 10).

7.3.3 Temporary Piping

SVE wells will be connected to the treatment equipment by temporary Schedule 40 PVC piping and/or flexible suction hose placed directly on the crushed recycled aggregate surface. Vapor will be conveyed to a 6-inch diameter common header line (adequate to support the combined soil vapor pressures and flow rates from each SVE well), and then to the portable SVE equipment for treatment. A process flow diagram for the proposed system is shown on Figure 11. Each vapor extraction well head will be equipped with a vacuum gauge port and a ¼-inch brass tap that may be removed for insertion of a hotwire anemometer for flow measurement. A detail of the well head piping is shown in Figure 10.

7.3.4 Treatment Equipment

The treatment equipment will consist of a trailer- or skid-mounted system with a SCAQMD permit. The equipment will include a moisture knockout drum, a blower/compressor capable of applying a vacuum of 100 inches of water and a minimum flow rate of 500 to 1,000 cfm, a minimum of two 1,000-pound vapor-phase granular activated carbon (vGAC) vessels, and associated equipment connections. A piping and instrumentation diagram for the anticipated skid-mounted treatment system is shown on Figure 12. The size and arrangement of the vGAC vessels will depend on the specific requirements of the SCAQMD permit. The moisture knockout drum will be situated upstream of the compressor/blower with the vGAC vessels configured in series and installed downstream of the compressor/blower. The system will be connected to the SVE well piping grid.

The compressor/blower will convey extracted soil vapor from the SVE well field to the common header line, through the moisture knockout drum, and then to the vGAC vessels. Moisture that collects in the knockout drum will be manually pumped or transferred to and stored in 55-gallon capacity Department of Transportation-approved drums. The drums will be characterized and transported off-site for disposal on an as needed basis. Treated soil vapors conveyed through the vGAC vessels will be discharged to the atmosphere in compliance with SCAQMD permit conditions.

7.3.5 Startup Testing

Startup testing will be performed to verify the functionality of the equipment and collect information to document the area of influence of the SVE system. Functionality testing will include a diagnostic check of each component including, but not limited to, the knockout drum controls, compressor/blower operation, emergency shutdown controls, high temperature and level alarms, and leaks in piping.

Once the system has passed the functionality test, the system will be started and data will be collected for the purpose of documenting the area of influence. Testing will focus on two SVE wells, while the remaining SVE wells will be used as monitoring points during the area of influence test. The two SVE wells will be tested for approximately 6 hours using a step-vacuum test. The vacuum applied to each extraction well will be varied every 2 hours based on the approximate schedule summarized in Table 3.

Following startup and area of influence testing, a report documenting the results will be submitted to the DTSC. The report will include as-built diagrams, summary of the installation and startup activities, data collected during area of influence testing, and vacuum versus flow relations for the tested wells. In addition, the report will document the plan for O&M and monitoring of the SVE system including a procedure for rebound testing, steps for closure, and copies of air permits.

7.3.5.1 Soil Vapor Sampling

Soil vapor samples will be collected from the SVE wells at the frequency shown in Table 3. These samples will be collected in Tedlar bags using a vacuum sample box and analyzed in the field for VOCs using a photoionization detector (PID). Prior to collecting soil vapor samples from the SVE wells, a volume equal to approximately two times the casing volume will be purged. The soil vapor samples collected during testing will be analyzed for total hydrocarbons using EPA Method TO-3 and VOCs using EPA Modified Method TO-15.

7.3.5.2 Vacuum and Flow Rate Monitoring

During startup testing, vacuum at selected SVE wells, and the treatment system will be monitored with a hand-held digital manometer at the time intervals shown in Table 3. SVE wells will be sealed at the wellheads during testing by closing the isolation gate valve shown in Figure 12. A quick-disconnect port installed in the piping will be used to measure the wellhead response to the applied vacuum at each SVE well. The observed vacuums will be used in establishing the area of influence.

The flow rate from each SVE well will be recorded using a digital hot wire anemometer connected to the SVE system at the time intervals shown in Table 3. The flow rate measurements will be used to assess flow rate capacities for the SVE wells.

7.3.6 Operations, Maintenance, and Monitoring

Operation of the SVE system will begin after completing start-up testing. The system will be monitored initially by demolition observation field personnel already present on-Site at a minimum of twice per week during the first month of operation. Operating personnel will collect measurements that will be used to evaluate the system's overall performance and effectiveness in remediating the VOC-impacted soils. Field measurements will consist of recording system operating parameters including: hours of operation, operating temperatures, extraction flow rates, and inlet and outlet vapor concentrations for the vGAC vessels using the same methods identified in the startup testing. SVE system monitoring will be performed in compliance with the SCAQMD permit requirements or minimally on a weekly basis.

Maintenance performed during routine system inspections and/or monitoring will comply with SVE vendor and/or equipment specifications. As part of the monitoring of the system, influent and effluent concentrations will be measured using a portable organic vapor meter such as a PID, which detects and quantifies organic vapors. Results of operation monitoring will be recorded on emission monitoring logs. Influent and effluent vapor samples will be collected in a 1-liter Tedlar bag using a sample collection box and submitted to an analytical laboratory on a monthly basis for the analyses prescribed in the SCAQMD permit. Additional monitoring will be performed in accordance with the SCAQMD permit to operate. A startup testing report will be submitted to DTSC within 60 to 90 days after completion of startup. Remediation monitoring reports will be provided to DTSC on a quarterly basis during the first year of operation, then semi-annually thereafter until remediation is deemed complete.

7.3.7 Schedule for Implementation and Completion

SVE of shallow and deep VOC-impacted soil will commence after below-grade demolition and soil excavation are completed in the Phase I area. The milestone phasing and completion of work as described in Section 01110 of the Technical Specifications (Appendix B) require the contractor to complete below-grade demolition work in the Phase I area within 40 calendar days after mobilizing to the Site and installation of required temporary facilities and controls. SVE system installation and SVE operations will begin approximately four weeks after contractor completion of below grade demolition work in the Phase I area.

SVE operation will continue until commercial/industrial facility construction commences or until effluent vapor monitoring from SVE wells indicate vapor concentrations have reached asymptotic conditions. If Site construction is delayed and subsurface concentrations still warrant SVE operations beyond 12 months, a Site-specific SCAQMD permit will be obtained.

If asymptotic conditions have not been reached prior to future commercial/industrial facility construction, SVE operation will be suspended until construction is complete, if necessary. After completion of construction, SVE operation will be restarted, and if needed, new SVE wells will be installed and operated until the following pre-closure requirements have been met.

1. The SVE system has targeted the zones of impacted soil on the basis of the initial design and quarterly monitoring.
2. The SVE system has been optimized based on routine monitoring and regular optimization reviews.
3. The optimized SVE system has met an asymptotic mass removal rate for the VOCs based on vapor samples collected for laboratory analysis and vapor flow measurements conducted at individual wells and/or the influent to the treatment system.

The system will then be shut down to undergo vapor rebound testing, followed by additional operations as necessary. The rebound testing process will be documented in the Startup documentation report discussed in Section 7.3.5. Post-remediation soil matrix confirmation sampling will be performed in previously defined VOC hot spot areas upon completion of rebound testing and termination of SVE operation.

While future Site development may limit physical access into certain areas, efforts will be made to obtain soil matrix samples from approximate locations consistent with previous VOC characterization sampling events in the VOC impacted areas. Approximately six soil borings will be advanced to groundwater and eight soil samples will be collected from both above and below the fine-grained unit located at a depth of approximately 50 feet bgs. These soil samples will be analyzed for VOCs using EPA Method 8260B/5035. Soil sampling results may be used to document the remaining concentrations of VOCs in soil for a land use covenant for the Site.

7.4 SHALLOW AND DEEP STODDARD SOLVENT-IMPACTED SOIL REMEDIAL ACTION IMPLEMENTATION

The preferred remedial technology for the shallow and deep Stoddard solvent-impacted soil in the Phase IIIb and Phase IV areas is SVE and bioventing. This remedy will be implemented during the below-grade demolition and soil remediation activities at the Site and prior to any subsequent redevelopment construction of other commercial/industrial facilities. Although bioventing is related to the process of SVE, and both technologies involve movement of air through the subsurface, the differences in objectives result in different design and operational requirements of the remedial systems (Leeson & Hinchee, 1996). The major distinction between these technologies is that SVE optimizes removal of low-molecular weight compounds by volatilization achieved through high rates of vapor extraction (under vacuum). SVE will be performed initially to remove the approximately 15 percent volatile fraction of COCs present in the Stoddard solvent areas. When vapor monitoring data indicate asymptotic conditions have been reached, the SVE system will be shut down and converted to a bioventing remedial process to continue the in situ remediation process of the less volatile hydrocarbon compounds remaining in the subsurface.

Bioventing optimizes biodegradation of aerobically degradable compounds using much lower air flow rates than those required for SVE systems, thus minimizing both volatilization and capital costs. The system conversion to bioventing would consist of reversing the air flow direction by injecting atmospheric air into the subsurface through the SVE piping grid and vent wells at a greatly reduced flow rate. Air injection would be achieved in a pulsed or intermittent manner, for the equivalent of approximately one day per week. Air injection rates will be modified as needed (increase or decreased) based on oxygen utilization rates.

A network of venting wells will be installed to depths of approximately 50 feet bgs in the areas where Stoddard solvent COCs exceed Site-specific remediation goals. The vent wells will be used for SVE, bioventing and monitoring. Specific details regarding the SVE and bioventing system and associated remediation equipment/components are provided below.

7.4.1 Site Preparation

Existing surface slabs and below-grade footings will be left intact in the Phase IIIB and IV areas during implementation of the in situ SVE and bioventing remedy to reduce odors and dust from the Stoddard solvent-impacted areas. The existing building slab may be used as a working surface for equipment and staging materials associated with the adjacent below grade demolition work.

A three-phase, 240-volt, 100-ampere temporary electrical power service will be installed in the vicinity of the south end of former Building 112A to power the SVE and bioventing system equipment.

7.4.2 Vent Well Installation

Venting wells will be installed in the Phase III and IV area at a single depth interval as presented below.

Vent Well Depth	Well Screen Interval (feet bgs)	Number of Wells
Surface to 50 feet bgs	15 to 50	15

Figure 13 provides the locations of the proposed vent wells. Wellhead completions will consist of a flush-mount well box to contain a flow-controlling gate valve, vacuum gauge port, and a ¼-inch brass tap that may be removed for insertion of a hotwire anemometer for flow measurement. A detail of the well head piping is shown on Figure 10. Each vent well will be constructed with a 2-inch diameter Schedule 40 PVC pipe with a 0.020-inch slot screen, sand filter pack, bentonite seal and concrete surface seal. Wells installed for initial SVE operation will also be used during subsequent bioventing activities. Prior to start-up, soil vapor samples will be collected from the vent wells to establish baseline conditions. Figure 10 contains a schematic construction diagram for the proposed vent wells.

7.4.3 Well Piping

Vent wells will be connected to the treatment equipment with Schedule 40 PVC piping placed along the surface of the slab, ground surface, or in below grade trenches constructed by saw-cutting and removing surface concrete slabs along designated piping corridors. Pipe construction and installation configuration will be determined in the field to accommodate below-grade demolition work. Piping trenches may be backfilled to slab grade with a one-sack cement slurry. A process flow diagram for the proposed bioventing system is shown in Figure 14.

7.4.4 Treatment Equipment

Initial SVE operations will be performed using a trailer-mounted system in conformance with a SCAQMD Various Locations permit. The system will be similar in configuration to the SVE unit proposed to remediate shallow and deep VOC-impacted soil as described in Section 7.3. The equipment will consist of a compressor/blower, two 1000-lb vGAC vessels, moisture knockout drum, and associated equipment connections. It is anticipated that the SVE equipment will be similar to that used for the Phase I area, and the piping and instrumentation diagram for the anticipated skid-mounted treatment system is shown as Figure 12. Extracted condensate captured in the moisture knockout drum during SVE operations will be characterized and transported off-site for disposal on an as-needed basis.

Bioventing equipment will consist of a separate skid-mounted system comprised of a minimum 5.0 horse power electric blower capable of injecting air up to 150 cfm at 10 pounds per square inch. The blower will be equipped with a dilution air valve and temperature probe. Atmospheric air will be injected at low-flow rates of approximately 1 to 3 cfm per vent well in a pulsed or intermittent manner, through a common header line that connects to each well to provide oxygen to native soil microbes. No volatile exhaust gases or fugitive emissions are anticipated to be generated that would require treatment because the compressor/blower will be injecting air at a very low rate and no vent wells will be open to the atmosphere.

7.4.5 Startup Testing

Startup testing will be performed to verify the functionality of the equipment, collect information to document the area of influence of the SVE system, and perform a respirometry test to confirm the size of the bioventing system needed. Functionality testing will include a diagnostic check of each component including, but not limited to, the knockout drum controls, compressor/blower operation, emergency shutdown controls, high temperature and level alarms, and leaks in piping.

Once the system has passed the functionality test, the SVE system will be started and data will be collected for the purpose of documenting the area of influence. Testing will focus on two vent wells, while the remaining vent wells will be used for monitoring during the area of influence test. The two vent wells will be tested for approximately 6 hours using a step-vacuum test as described in Section 7.3.5 at the frequency summarized in Table 3. At the conclusion of the SVE testing, the system will be shut down and an in situ respiration (ISR) test will be performed using the same vent wells.

Following startup, area of influence testing, and ISR testing a report documenting the results will be submitted to the DTSC. The report will include as-built diagrams, summary of the installation and startup activities, data collected during area of influence testing, data collected during ISR testing, and vacuum versus flow relations for the tested well. In addition, the report will document the plan for O&M and monitoring of the SVE and bioventing systems including a procedure for rebound testing, steps for closure, and copies of air permits.

7.4.5.1 Soil Vapor Sampling

Soil vapor samples will be collected from the vent wells at the frequency shown in Table 3. These samples will be collected in Tedlar bags using a vacuum sample box and analyzed in the field for VOCs using a PID. Samples will also be analyzed for oxygen content, carbon dioxide and explosive gases with a landfill gas monitor (or equivalent meter). Prior to collecting soil vapor samples from the vent wells, a volume equal to approximately two times the casing volume will be purged. The soil vapor samples collected during testing will be analyzed for total hydrocarbons using EPA Method TO-3 and VOCs using EPA Modified Method TO-15.

The vapor extraction will be continued until oxygen concentrations measured in the vent wells is between 19 percent and 21 percent. The system will then be shut down and ISR data will be collected from the test well and the monitoring wells. ISR test vapor samples will be collected from the vent wells at the frequency shown in Table 3, and theses samples will be analyzed, as before, for VOCs, oxygen, carbon dioxide, and methane. Differential pressure, static pressure, and temperature measurements will be recorded at each vent well. The vapor sample collection schedule proposed in Table 3 will be modified as necessary with the goal of continuing sampling until the in situ oxygen content drops by at least 7 percent. These results will be used to calculate the oxygen utilization rate.

7.4.5.2 Vacuum and Flow Rate Monitoring

During startup testing, vacuum at selected vent wells, and the treatment system will be monitored with a hand-held digital manometer at the time intervals shown in Table 3. Vent wells will be sealed at the wellheads during testing by closing the isolation gate valve shown on Figure 12. A quick-disconnect port installed in the piping will be used to measure the wellhead response to the applied vacuum at each SVE well. The observed vacuums will be used in establishing the area of influence.

The flow rate from each vent well will be recorded using a digital hot wire anemometer connected to the SVE system at the time intervals shown in Table 3. The flow rate measurements will be used to assess flow rate capacities for the vent wells.

7.4.6 Operations, Maintenance, and Monitoring

The SVE system will operate initially and be monitored bi-weekly until effluent vapor monitoring from vent wells indicate vapor concentrations have reached asymptotic conditions based on vapor samples collected for laboratory analysis and vapor flow measurements conducted at individual wells and/or the influent to the treatment system. After asymptotic conditions are reached, the system will be converted to bioventing without pulse-mode operation or performance of rebound testing. Pulse mode operations or rebound testing will not be performed because continued remediation of the Stoddard solvent impacts will be achieved through the bioventing process. Bioventing will degrade the less volatile hydrocarbon fraction still present along with any residual volatile constituents that may still be present and are degrading. Following conversion of the SVE and bioventing equipment, start-up will consist of a diagnostic check of the treatment equipment and adjusting the air flow at each vent well. Once operational, the bioventing system will require very little maintenance and monitoring.

The ISR testing performed during startup testing would be periodically repeated to monitor oxygen utilization rates and carbon dioxide production rates to evaluate progress of remediation. Methane, carbon dioxide, oxygen, differential pressure, static pressure, and temperature will be measured using a landfill gas monitor (or equivalent) with a sampling frequency as determined during the startup testing. The measurements will be recorded in a daily field log. The frequency of the ISR testing will be at a minimum monthly for the first six months of operation and quarterly thereafter. Monitoring frequency will be adjusted based on monitoring results. ISR rates can be expected to vary over time and a general decrease in rates over the longer term of hydrocarbon biodegradation. A startup testing report will be submitted to DTSC within 60 to 90 days after completion of startup. Remediation monitoring reports will be provided to DTSC on a quarterly basis during the first year of operation, then semi-annually thereafter until remediation is deemed complete.

The system will be operated until soil gas monitoring results through existing vent wells indicate biodegradation is no longer occurring at a significant rate. Soil confirmation sampling will then be performed to substantiate that Site-specific remediation goals have been achieved for the Stoddard solvent related COCs, and, if necessary to support a land use covenant for the Site.

When the use of the Phase IIIB and IV areas are no longer needed for Site construction laydown and staging, or when monitoring data suggest the remediation of the Stoddard solvent vapor phase is sufficient for slab removal, the surface slab and below grade structures will also be demolished and removed in a manner similar to other parts of the Site.

7.4.7 Schedule of Implementation and Completion

SVE and bioventing of shallow and deep Stoddard solvent-impacted soil will begin within 30 days after Site mobilization for below-grade demolition. SVE and bioventing operations will continue until data from soil gas monitoring through existing vent wells indicate that biodegradation is no longer occurring at a significant rate and that soil testing confirms that the Site-specific remediation goals have been met.

7.5 SOIL MANAGEMENT DURING AND AFTER BELOW-GRADE DEMOLITION

The demolition contractor will be responsible for handling and disposal of impacted soil removed during demolition. A field Geologist or Engineer will be present while below-grade demolition and soil removal is being performed at the Site. There is a potential for impacted soil to be encountered during removal of pavements, floor slabs, footings, foundations, utilities, and other below-grade structures (e.g., sumps, drains, etc.). As these features are removed during demolition, the demolition contractor will follow the procedures described in this section. The procedures associated with the below grade-demolition described in this section are included in the project technical specifications provided in Appendix B.

During removal of the slab and other below-grade structures, the demolition contractor will monitor for hazardous vapors and observe the condition of the underlying surface of the concrete slab and the condition of the soil underlying the slab. If areas of impacted soil that were not included in the areas shown on Figures 3 and 7 and addressed in Section 7.2 are observed (based on visual staining and/or noticeable odors or by testing proposed in Section 7.1.3), the demolition contractor will take the following general steps.

1. Notification - notify both the Site manager and the field Geologist or Engineer present on-Site, and begin air monitoring with a PID.

2. Monitoring - conduct initial air monitoring for health and safety and SCAQMD permitting compliance with the PID. If PID readings are above Rule 1166 permit criteria, continue using Rule 1166 requirements and the requirements of Section 02114 of the Technical Specifications (Appendix B). If the PID readings are above health and safety air monitoring thresholds, workers will upgrade to the appropriate PPE specified in the demolition contractor's Health and Safety Plan (HASP).

3. Segregation - segregate impacted soil from the slab or structure(s) already being removed. As visually impacted structures are removed, the suspect soil directly adjacent to and beneath the structures will also be excavated, segregated, and/or stockpiled on plastic (with a minimum thickness of 6 mil) and covered with plastic or placed in covered roll-off bins or in end dumps, as needed based on volume.

4. Soil removal - conduct exploratory soil removal to assess the extent of impacted soil based on visual indicators and continue air monitoring:

- if the area of impacted soil appears to be a "small area" (up to 100 cubic yards of soil), continue to remove soil and stockpile as needed, then continue with demolition work;

- if the area of impacted soil appears to be greater than 100 cubic yards ("large area"), work in this area will be coordinated and phased with other excavations of known COC-impacted soils. The area will then be visually demarcated by the contractor; and

- COC-impacted areas will then be excavated to the extent necessary to meet Site-specific remediation goals discussed in Section 5.3.

5. Confirmation sampling - confirmation soil sampling will be conducted using the procedures described in the QAPP (Geomatrix, 2007). The analytical suite for soil samples tested may include VOCs, PCBs, or metals. If additional samples are collected, the soil analytical results will be compared to the Site-specific remediation goals discussed in Section 5.3 to assess the need for additional removal or backfilling of the excavation. If soil testing is deemed not necessary based on existing data, the excavation will be backfilled.

6. Excavation backfill - after confirmation sampling is complete, excavations will be backfilled and compacted by the demolition contractor as described in the Below Grade Demolition Plan (AMEC, 2011a). Concrete debris with concentrations of COCs less than the remediation goals will be crushed to the gradations provided in Section 02050 of the Technical Specifications, and backfilled and compacted pursuant to Section 02351 of the Technical Specifications (Appendix B).

During below-grade demolition, and as required by DTSC, shallow soil testing will be conducted below the buried rail lines during removal. Once the rail lines are removed, shallow soil samples will be collected and tested for metals. In addition, the underlying soil will be observed for petroleum hydrocarbon impacts. If soil samples collected beneath the rail lines are impacted with metals and/or petroleum hydrocarbons at concentrations above the Site-specific remediation goals, the steps described above for soil removal, confirmation sampling, and excavation backfill will be conducted.

During these activities, health and safety procedures will be implemented by the demolition contractor as described in the contractor's Site-specific HASP. In addition, dust suppression and vapor and/or odor control will be implemented by the demolition contractor as needed using the requirements of Section 01501 of the Technical Specifications (Appendix B).

Any stockpiled soil will be sampled for laboratory analysis. Soil and waste disposal profiling will be completed by the contractor and soil will be transported using appropriate shipping manifests or bills-of-lading. The demolition contractor will notify the Site manager prior to shipping any impacted soil and waste off-site. Storm water management associated with the stockpiled materials will be the responsibility of the demolition contractor pursuant to Section 01502 of the Technical Specifications (Appendix B) and the contractor's SWPPP.

After completion of the below-grade demolition, soil excavation work, and installation of the SVE and SVE/bioventing systems, a Site-specific soil management plan will be prepared and incorporated into the land use covenant described in Section 7.6. The soil management plan will describe the procedures for handing impacted soil or crushed concrete (containing PCBs greater than or equal to 1 mg/kg) that will remain on-Site at concentrations below the Site-specific remediation goals.

7.6 LAND USE COVENANT

The Site is zoned for industrial use, and the City of Vernon zoning regulations prohibit development of new residential properties within the City. The future Site use will remain industrial or commercial. A land use covenant is proposed to be issued by Pechiney, with concurrence from the City of Vernon, to restrict future Site use (i.e., prohibit residential development) and use of groundwater from the first water bearing unit within the Site perimeter. The land use covenant will be prepared after completion of the below demolition, soil excavation work and installation of the SVE and SVE/bioventing systems.

7.7 O&M AGREEMENT AND PLAN

The proposed remedy described above in Sections 7.3 and 7.4 (SVE and SVE/bioventing) will be covered under an O&M agreement between Pechiney and DTSC. This agreement will provide a list of the responsibilities for O&M work and it will include items such as future Site access requirements, implementation and monitoring of the SVE and SVE/bioventing systems, and protection and maintenance of the groundwater wells and SVE wells. As part of the agreement, an O&M plan will be prepared and it will be incorporated into the land use covenant for the Site.

8.0 PUBLIC PARTICIPATION

As required by the NCP 40 CFR 300.430(c)(1) and DTSC, Pechiney will ensure that the public is informed and has the opportunity to participate in the overall remedial action for the Site. A comprehensive community involvement plan will be submitted following the submittal of this RAP. Public participation will be implemented as part of demolition and remediation activities. The community involvement program and activities are described below.

8.1 COMMUNITY INVOLVEMENT PROGRAM

The objective of the community involvement program is to inform the community of the progress of demolition and remediation activities and to effectively respond to health, environment and safety concerns and questions. The community involvement program will be consistent with DTSC requirement and CERCLA as implemented by the NCP 40 CFR 300.430(c)(1). The purpose of these activities as stated by the NCP 40 CFR 300.430(c)(2)(ii)(A) is to "ensure the public appropriate opportunities for involvement in a wide variety of Site related decisions, including Site analysis and characterization, alternatives analysis, and selection of remedy; and to determine, based on community interviews, appropriate activities to ensure such public involvement."

Objectives of the community involvement program include:

- soliciting input from the community on concerns about the remedial activities;
- establishing effective channels of communication between the community, Pechiney, and the DTSC;
- informing the community about progress of the remedial activities; and
- providing adequate opportunities for the community to participate and comment on the proposed remedial activities.

8.2 COMMUNITY INVOLVEMENT ACTIVITIES

To date, Pechiney has conducted community outreach activities to its immediate neighbors including face-to-face visits from the project and field engineers. As part of the below-grade demolition phase of the project, DTSC has begun the community interviews and may distribute information to the immediate neighbors of the Site including proposed activities and schedule of work.

Prior to the start of the remedial activities, DTSC will expand its outreach and distribute an information fact sheet to businesses and residents surrounding the Site and to other interested stakeholders. This fact sheet will include information about the Site, remedial activities, and project contacts. Additionally, a local information repository will be established to make documents and other information available for the public and a Site mailing list will be developed.

This RAP will be made available to the public for a comment period of at least 30 days. DTSC will respond to any comments received during the public comment period and will provide a timely opportunity for the public to access documents.

Depending on the level of community response and level of interest, DTSC may hold a community meeting to discuss the components of the RAP, the Site's history, and proposed remedial work. The meeting may also provide the opportunity for the public to submit comments on the RAP. DTSC will work with the community to develop a meeting format that best suits the needs of the community.

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TABLES

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TABLE 1A

SITE-SPECIFIC REMEDIATION GOALS - VOCs IN SOIL VAPOR

Former Pechiney Cast Plate, Inc. Facility
Vernon, California

Compound	Remediation Goal (µg/L)	Explanation
Phase I Area		
Chloroform	6.7	Derived from the Cancer-based RBSL[1] for Indoor Commercial/Industrial Workers (2.0 µg/L). A chloroform concentration of 6.7 µg/L is protective of cumulative indoor commercial/industrial worker exposure to the VOC COCs in the Phase I area, based on a target cancer risk of 10^{-5}.
PCE	7.3	Derived from the Cancer-based RBSL for Indoor Commercial/Industrial Workers (2.2 µg/L). A PCE concentration of 7.3 µg/L is protective of cumulative indoor commercial/industrial worker exposure to the VOC COCs in the Phase I area, based on a target cancer risk of 10^{-5}.
TCE	21	Derived from the Cancer-based RBSL for Indoor Commercial/Industrial Workers (6.3 µg/L). A TCE concentration of 21 µg/L is protective of cumulative indoor commercial/industrial worker exposure to the VOC COCs in the Phase I area, based on a target cancer risk of 10^{-5}.
Phase IIIb and Phase IV Areas		
TPH as Stoddard solvent	500	Derived from the Noncancer-based RBSL for Indoor Commercial/Industrial Workers (1500 µg/L). A Stoddard solvent concentration of 500 µg/L is protective of cumulative indoor commercial/industrial worker exposure to the VOC COCs in the Phase IIIb and Phase IV areas, based on a target hazard index of 1.
1,2,4-TMB	12.3	Derived from the Noncancer-based RBSL for Indoor Commercial/Industrial Workers (37 µg/L). A 1,2,4-TMB concentration of 12.3 µg/L is protective of cumulative indoor commercial/industrial worker exposure to the VOC COCs in the Phase IIIb and Phase IV areas, based on a target hazard index of 1.
1,3,5-TMB	10.7	Derived from the Noncancer-based RBSL for Indoor Commercial/Industrial Workers (32 µg/L). A 1,3,5-TMB concentration of 10.7 µg/L is protective of cumulative indoor commercial/industrial worker exposure to the VOC COCs in the Phase IIIb and Phase IV areas, based on a target hazard index of 1.

Note:
1. Developed based on the methodology described in Appendix C of the FS (AMEC, 2012), RBSLs were used to conduct the screening-level human health risk assessment for the Site.

Abbreviations:
COC = chemical of concern
µg/L = micrograms per liter
PCE = tetrachloroethene
RBSL = risk-based screening level
TCE = trichloroethene
1,2,4-TMB = 1,2,4-trimethylbenzene
1,3,5-TMB = 1,3,5-trimethylbenzene
TPH = total petroleum hydrocarbons
VOC = volatile organic compound

TABLE 1B

DRAFT

SITE-SPECIFIC REMEDIATION GOALS -
PCBs IN SOIL AND CONCRETE, AND METALS AND TPH IN SOIL

Former Pechiney Cast Plate, Inc. Facility
Vernon, California

Compound	Remediation Goal (mg/kg)	Explanation
PCBs in Soil		
Aroclor-1254	2.0	Noncarcinogenic RBSL[1] for construction workers. Also protective of commercial/industrial worker exposure.
Total Aroclors *For soil that may be left exposed at the surface (0 to 5 feet bgs)*	3.5	Based on the regression analysis for dioxin-like PCB congeners versus total Aroclors in combined soil and concrete presented in Appendix E of the FS (AMEC, 2012), the total Aroclor concentration that would result in a maximum dioxin TEQ concentration of 81 pg/g.[2] Protective of cumulative commercial/industrial worker exposure, and cumulative construction worker exposure, to PCBs.
Total Aroclors *For subsurface soil (5 to 15 feet bgs) that only construction workers may come into contact with during excavation, grading, etc. (and that would remain at 5 to 15 feet bgs)*	23	Based on the regression analysis for dioxin-like PCB congeners versus total Aroclors in combined soil and concrete presented in Appendix E of the FS (AMEC, 2012), the total Aroclor concentration that would result in a maximum dioxin TEQ concentration of 530 pg/g.[3] Protective of cumulative construction worker exposure to PCBs.
PCBs in Concrete		
Total Aroclors	3.5	Based on the regression analysis for dioxin-like PCB congeners versus total Aroclors in combined soil and concrete presented in Appendix E of the FS (AMEC, 2012), the total Aroclor concentration that would result in a maximum dioxin TEQ concentration of 81 pg/g. Also protective of cumulative construction worker exposure to PCBs. Applying this remediation goal ensures that waste criteria for concrete containing PCBs is also met [i.e., less than 50 mg/kg, as defined in 40 CFR Section 761.61(a)(4)(i)(A)].
Metals in Soil		
Arsenic	10	Site-Specific Background Concentration in Soil, established as described in Appendix B of the FS (AMEC, 2012).
TPH in Soil		
c5-c10 hydrocarbons, c6-c10 hydrocarbons, c7-c12 hydrocarbons, and Stoddard solvent	500	Screening Level for the Protection of Groundwater for TPH gasoline range (c4-c12) from the Los Angeles RWQCB Guidebook.[4]
c10-c20 hydrocarbons and c10-c28 hydrocarbons	1000	Screening Level for the Protection of Groundwater for TPH diesel range (c13-c22) from the Los Angeles RWQCB Guidebook.[4]
c21-c28 hydrocarbons	10,000	Screening Level for the Protection of Groundwater for TPH as residual fuel (c23-c32) from the Los Angeles RWQCB Guidebook.[4]

Notes:
1. Developed based on the methodology described in Appendix C of the FS (AMEC, 2012), RBSLs were used to conduct the screening-level human health risk assessment for the Site.
2. Based on the carcinogenic RBSL for dioxin-like PCB congeners for outdoor commercial/industrial workers (8.1 pg/g TEQ), adjusted to a target cancer risk of 10-5.
3. Based on the carcinogenic RBSL for dioxin-like PCB congeners for construction workers (53 pg/g TEQ), adjusted to a target cancer risk of 10-5.
4. Los Angeles RWQCB Interim Site Assessment and Cleanup Guidebook (RWQCB Guidebook, May 1996; updated May 2004), for petroleum hydrocarbons and aromatic hydrocarbons (benzene, toluene, ethylbenzene, and total xylenes [BTEX] compounds) in soil. The selected screening levels were taken from Table 4-1 assuming distance above groundwater is 20 to 150 feet.

Abbreviations:
bgs = below ground surface
CFR = Code of Federal Regulations
FS = Feasibility Study
mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
pg/g = picograms/gram
RBSL = risk-based screening level
RWQCB = California Regional Water Quality Control Board
TEQ = toxic equivalent
TPH = total petroleum hydrocarbons

TABLE 1C **DRAFT**

SITE-SPECIFIC REMEDIATION GOALS[1] -
VOCs IN SOIL

Former Pechiney Cast Plate, Inc. Facility
Vernon, California

Depth (Feet)	Concentration in µg/kg						
	TCE	PCE	Benzene	Toluene	Ethylbenzene	Xylenes	1,2-DCA
0	152	764	15	9058	15,349	97,239	1.8
10	145	732	15	8670	14,690	93,069	1.7
20	138	694	14	8227	13,940	88,314	1.6
30	130	655	13	7769	13,164	83,398	1.5
40	122	615	12	7292	12,356	78,278	1.4
50	114	572	11	6777	11,484	72,756	1.3
60	80	404	8	4790	8116	51,415	0.9
70	60	301	6	3565	6040	38,267	0.7
80	52	260	5	3081	5220	33,071	0.6
90	36	183	4	2164	3667	23,230	0.5
100	27	138	3	1634	2768	17,538	0.5
110	12	59	1	702	1190	7536	0.5
120	9	44	1	530	900	5694	0.5
130	5	19	1	229	391	2466	0.5
140	5	10	1	150	300	1750	0.5
149	5	5	1	150	300	1750	0.5

Note:

1. Calculations based on Appendix A, "Attenuation Factor Method For VOCs" of "Remediation Guidance For Petroleum and VOC Impacted Sites" in Interim Site Assessment & Cleanup Guidebook published by the California Regional Water Quality Control Board, Los Angeles Region.

Abbreviations:

1,2-DCA = 1,2-dichloroethane
PCE = tetrachloroethene
TCE = trichloroethene
µg/kg = micrograms per kilogram
VOC = volatile organic compound

TABLE 2

SUMMARY OF ALTERNATIVES AND EVALUATION CRITERIA

Former Pechiney Cast Plate, Inc. Facility
Vernon, California

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Overall Protection of Human Health and Environment	○	●	●	Ɵ
Compliance with State and Federal Requirements (ARARs)	○	●	●	●
Long-term Effectiveness and Permanence	○	●	●	●
Reduction of Toxicity, Mobility or Volume through Treatment	○	●	●	Ɵ
Total Cost	$0	$33,200,000	$4,400,000	$14,300,000
Short-term Effectiveness	○	●	●	●
Implementability	●	●	●	Ɵ
Regulatory Agency Acceptance	○			
Community Acceptance	○			

● = Fully meets criterion

Ɵ = Partially meets criterion

○ = Does not meet criterion

Alternative 1: No Action

Alternative 2: Excavation and Disposal of COC-Impacted Soil and Demolition and Disposal of PCB-Impacted Concrete

Alternative 3: Excavation and Disposal of Shallow COC-Impacted Soil, SVE for Shallow and Deep VOC-Impacted Soil, SVE and Bioventing for Shallow and Deep Stoddard Solvent-Impacted Soil, and Demolition and Disposal of PCB-Impacted Concrete

Alternative 4: In Situ Stabilization of Shallow PCB/Metals-Impacted Soil and Deep Stoddard Solvent-Impacted Soil, SVE for Shallow and Deep VOC-Impacted Soil, and Demolition and Disposal of PCB-Impacted Concrete

TABLE 3 DRAFT

SVE AND RESPIROMETRY STARTUP PLAN

Former Pechiney Cast Plate, Inc. Facility
Vernon, California

SVE STARTUP/AREA OF INFLUENCE TESTING (Phase I and Phase IIIB/IV Areas)			
· Vary applied vacuum to each test well:	4, 6, 8 in Hg		
· Time Increment:	2 hours per applied vacuum (step)		
· Two vapor extraction wells:	6 hours per well		
FIELD PARAMETER MONITORING SCHEDULE			
Parameter	**Monitoring Points[1]**	**Time[2]**	**Method[3]**
Vapor VOC Concentrations	2 test wells	start and each 2 hours	PID[4]
	all monitoring wells	beginning and end of each step	
	system inlet and outlet	at end of each 2 hours operation	
Vacuum	test and all monitoring wells	0, 30, 60, 90, 120 minutes	Manometer
Flow rate	2 test wells	0, 30, 60, 90, 120 minutes	Hot Wire Anemometer
LABORATORY SAMPLING AND ANALYSIS SCREENING			
Parameter	**Monitoring Points[1]**	**Time[2]**	**Method[3]**
VOC Concentrations	2 test wells	At end of each 2 hours operation	TO-3, TO-15
Total VOCs and Speciation[5]	system inlet and outlet	120 minutes	TO-3, TO-15
SVE OPERATION (Phase I and Phase IIIB/IV Areas)			
FIELD PARAMETER MONITORING SCHEDULE			
Parameter	**Monitoring Points[1]**	**Time[2]**	**Method[3]**
Vapor VOC Concentrations	all wells	Monthly	PID[4]
	system inlet and outlet	Weekly[6]	
Vacuum	all wells	Monthly	Manometer
Flow rate	all wells	Monthly	Hot Wire Anemometer
LABORATORY SAMPLING AND ANALYSIS SCREENING			
Parameter	**Monitoring Points[1]**	**Time[2]**	**Method[3]**
Total VOCs and Speciation[5]	system inlet and outlet	Monthly	TO-3, TO-15
BIOVENT OPERATION (Phase IIIB/IV Area)			
· System to be operated on a monthly basis for the first six months of bioventing operations and quarterly thereafter.			
FIELD PARAMETER MONITORING SCHEDULE			
Parameter	**Monitoring Points[1]**	**Time[2]**	**Method[3]**
Flow rate	test wells	at each startup prior to shutdown	Hot Wire Anemometer
Pressure	test wells	at each startup prior to shutdown	Manometer
RESPIRATION TESTING (Phase IIIB/IV Areas)			
· Shut down system after verifying initial oxygen concentrations meet target of 19% to 21%.			
· Select up to four respiration test wells based on operation and initial readings.			
· Collect samples at start and 0.5, 1, 2, 3, 4, 6 hours with variation as necessary based on observed oxygen depletion rates.			
· Respiration testing shall not occur during periods of falling barometric pressure (windy or inclement weather.)			
· Performed on a monthly basis for the first six months of bioventing operations and quarterly thereafter.			
FIELD PARAMETER MONITORING SCHEDULE			
Parameter	**Monitoring Points[1]**	**Time[2]**	**Method[3]**
Vapor VOC Concentrations	all wells	end of testing	PID
	test wells	0, 0.5, 1, 2, 3, 4, 6 hours	
CO_2, O_2, and Methane	all wells	end of testing	Landfill Gas Monitor[6]
	test wells	0, 0.5, 1, 2, 3, 4, 6 hours	
Vacuum	test wells	0, 0.5, 1, 2, 3, 4, 6 hours	Manometer

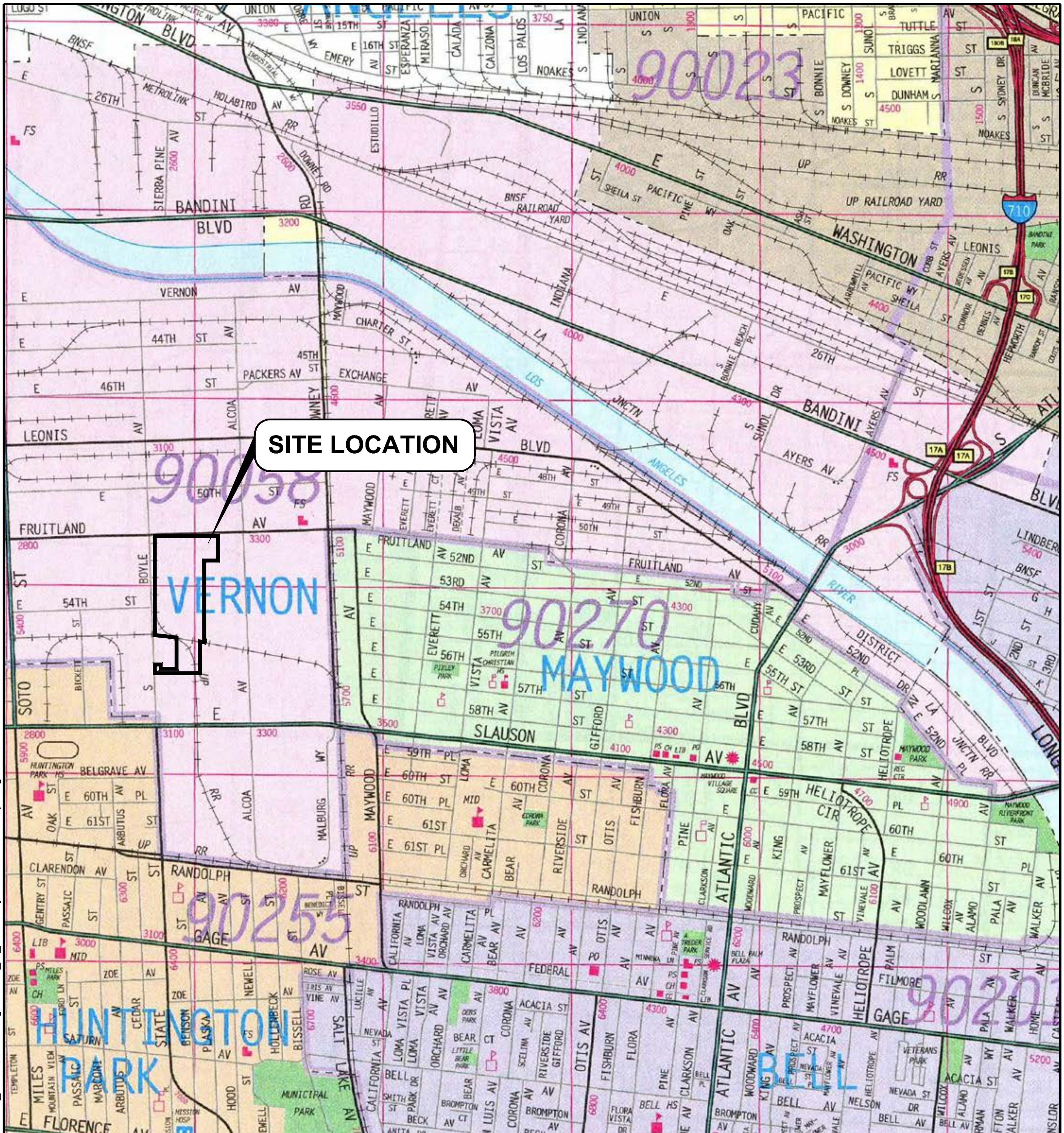
Notes:

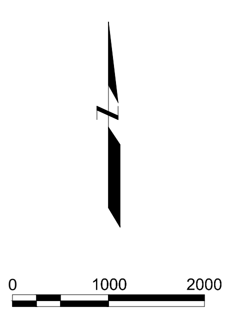
1. Two wells will be selected for startup and area of influence testing.
2. Time after commencement of test run.
3. Field instrument, device, sample container, or laboratory analytical method.
4. Samples will be collected in a Tedlar bag using a vacuum sample collection box and analyzed with a PID.
5. Subject to permit requirements.
6. Hand-held instrument to monitor O_2, CO_2, and LEL may be CES Landtec GEM-500, CES Landtec GEM-2000, or engineer-approved equivalent.

Abbreviations:

SVE = soil vapor extraction
VOC = volatile organic compound
PID = photoionization detector

FIGURES





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SITE LOCATION MAP
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 1

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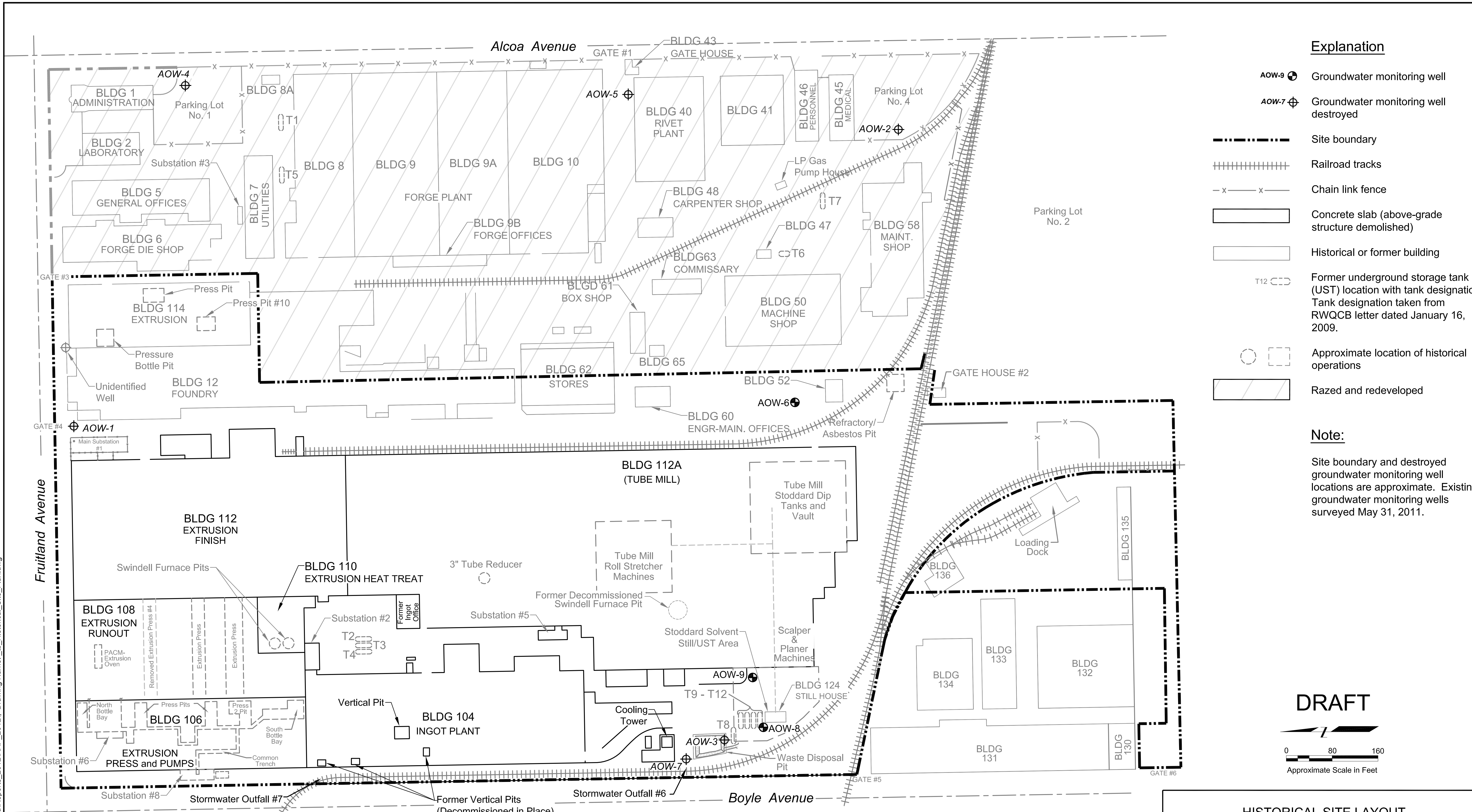

HISTORICAL SITE LAYOUT
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 2

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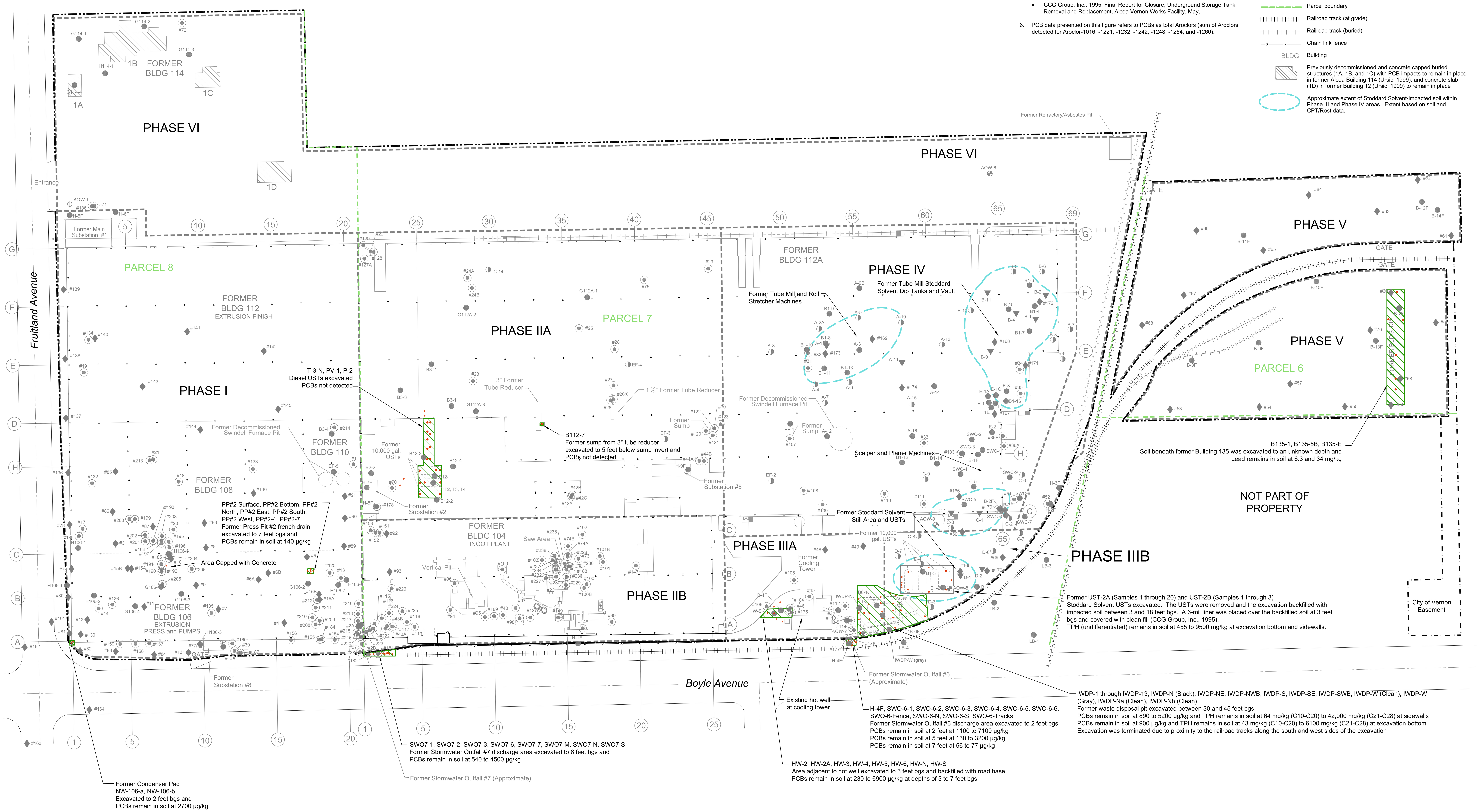
Notes:

1. Historical sample locations are approximate.
2. PCB sample results reported in micrograms per kilogram (µg/kg). See Appendix A of the Feasibility Study (AMEC, 2012).
3. TPH sample results reported in milligrams per kilogram (mg/kg).
4. Concrete core locations are shown on Figure 4.
5. The approximate extent of Stoddard Solvent-impacted soil is based on the following documents:
   - AMEC, 2012, Feasibility Study, Former Pechiney Cast Plate, Inc. Facility, Vernon, California, May 7.
   - Environmental Protection and Compliance, Inc., 2006, Stoddard Solvent Impacted Soils Investigation in Support of Monitored Natural Attenuation Survey No. 5, September 26-October 4, 2005, Former Alcoa Vernon Facility, Vernon, California, May 25.
   - Morrison Knudsen Corporation, 1995, Final Report Stoddard Solvent System Field Investigation, Aluminum Company of America, October 27.
   - CCG Group, Inc., 1995, Final Report for Closure, Underground Storage Tank Removal and Replacement, Alcoa Vernon Works Facility, May.
6. PCB data presented on this figure refers to PCBs as total Aroclors (sum of Aroclors detected for Aroclor-1016, -1221, -1232, -1242, -1248, -1254, and -1260).

Explanation

Previous excavation area (all previous limits of excavation are approximate)
Sample taken during excavation activities
AOW-9 Groundwater monitoring well
AOW-3 Groundwater monitoring well destroyed
#90 Geomatrix and AMEC Geomatrix soil vapor sampling point
#109 Geomatrix and AMEC Geomatrix soil boring
B-1 Approximate location of historical boring
D-1 Approximate location of historical CPT
C-1 Approximate location of historical vapor extraction well (destroyed 2006)
20 B Column and row numbering system for footings
Site boundary
Phasing area boundary
Parcel boundary
Railroad track (at grade)
Railroad track (buried)
Chain link fence
BLDG Building
Previously decommissioned and concrete capped buried structures (1A, 1B, and 1C) with PCB impacts to remain in place in former Alcoa Building 114 (Ursic, 1999), and concrete slab (1D) in former Building 12 (Ursic, 1999) to remain in place
Approximate extent of Stoddard Solvent-impacted soil within Phase III and Phase IV areas. Extent based on soil and CPT/Rost data.



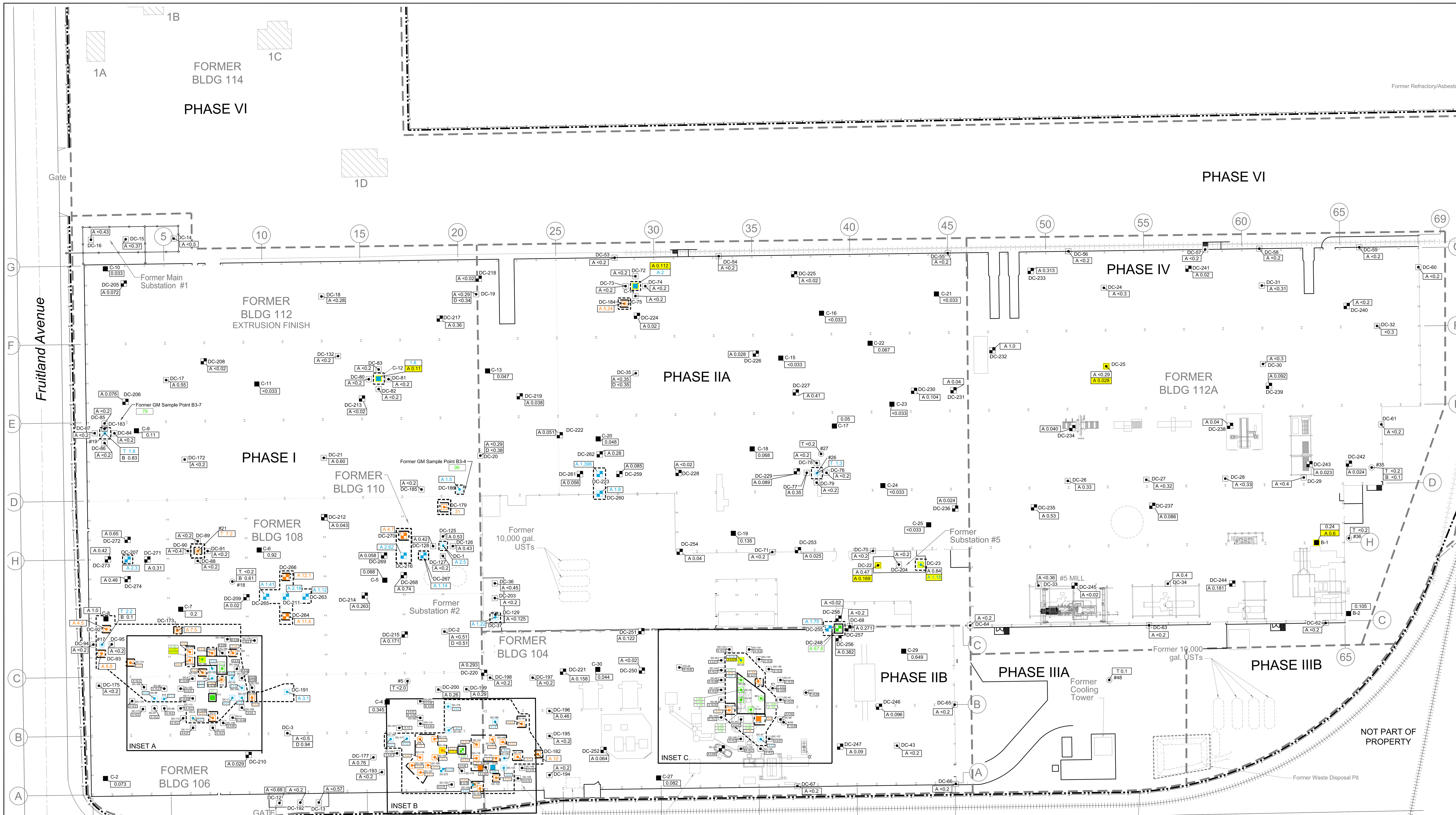
DRAFT

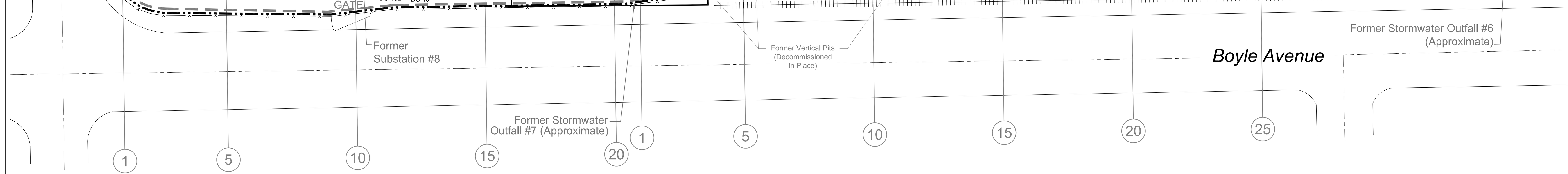
0 25 50
Approximate Scale in Feet

Basemap modified from Pechiney Cast Plate, Inc. Site Plan dated January 9, 2002; Geraghty & Miller, Inc. "Groundwater Elevation and Volatile Organic Compound Concentrations December 8, 1994" Figure dated February 2, 1995; Aluminum Company of America "Works General-MPA" Figure dated October 10, 1984; and Los Angeles County Assessor's Office Parcel Map 6310/Sheet 8 dated November 5, 1958.

Note: Figure shall be produced in color to maintain information.

SAMPLE LOCATIONS AND AREAS PREVIOUSLY EXCAVATED Former Pechiney Cast Plate, Inc. Facility 3200 Fruitland Avenue Vernon, California		
By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 3



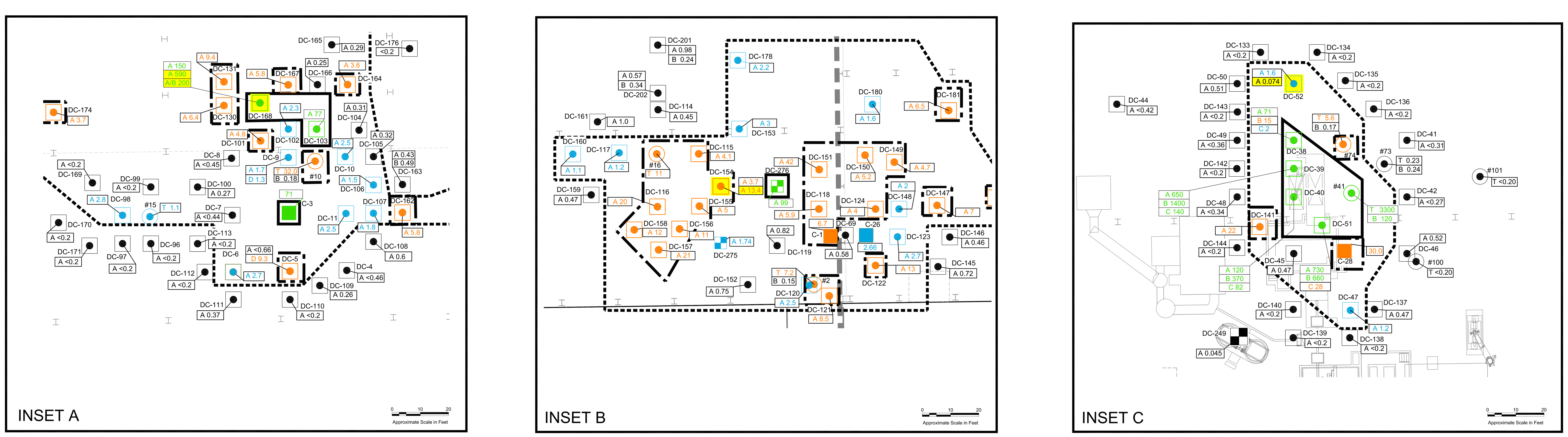


DIOXIN TEQs IN CONCRETE

Results shown in picograms per gram

Sample Location	Sample ID	Dioxin TEQ
B-1	B-1-A1	94.6
C-12	C-12-A	2.96
C-14	C-14-A	5.87
DC-22	DC-22-A	24.7
DC-23	DC-23-A	52.3
DC-25	DC-25-A	2.81
DC-52	DC-52-A	5.13
DC-154	DC-154-A	656
DC-168	DC-168-C	14,250

TEQ = Toxic Equivalent



Notes:

1. All locations are approximate.
2. All samples are bulk samples unless noted otherwise.
3. Samples analyzed using EPA Method 8082; refer to Appendix A of the Feasibility Study (AMEC, 2012) for a summary of test methods and analytical results.
4. Bulk sample results reported in milligrams per kilogram (mg/kg).
5. References:
   - AMEC, 2012, Feasibility Study, Former Pechiney Cast Plate, Inc. Facility, Vernon, California, May 7.
   - AMEC Geomatrix, Inc., 2009, Polychlorinated Biphenyls Notification Plan, Former Pechiney Cast Plate, Inc. Facility, Vernon, California, July 10.
   - AMEC Geomatrix, Inc., 2010, Responses to U.S. EPA Conditions C.2, C.3, C.5, and C.6 listed in the July 2, 2010 Conditional Approval, Former Pechiney Cast Plate Facility, Vernon, California, December 29.
   - Geomatrix Consultants, Inc. (Geomatrix), 2006a, Phase II Environmental Site Assessment Report, Pechiney Cast Plate Facility, Vernon, California, March 9.
   - Geomatrix, 2006b, Supplemental Phase II Environmental Site Assessment Report, Pechiney Cast Plate Facility, Vernon, California, December 19.
   - Geomatrix, 2006c, Above Grade Demolition Completion Report, Pechiney Cast Plate, Inc. Facility, Vernon, California, December 26.
   - McCulley, Frick & Gilman (MFG), 1998, Limited Phase II Environmental Investigation, Alcoa Cast Plate, 5151/5401 Alcoa Avenue, Vernon, California, September 15.
   - Geraghty and Miller, Inc., 1990, Final Report, Phase III Environmental Assessment for Alcoa - Vernon Plant, Vernon, California, September 6.
6. PCB data presented on this figure refers to PCBs as total Aroclors (sum of Aroclors detected for Aroclor-1016, -1221, -1232, -1242, -1248, -1254, and -1260).

Explanation

DC-01 ▣	Concrete core sample (Geomatrix, 2006c and AMEC Geomatrix, 2009 and 2010)
#1 ◉	Soil boring with concrete core sample (Geomatrix, 2006a and 2006b)
C-30 ■	Concrete core sample (MFG, 1998)
	Site boundary
	Phasing area boundary
	Railroad track (on grade)
	Railroad track (buried)
	Chain link fence
	Building wall and columns
20 B	Column and row numbering system for footings
BLDG	Building
PCBs	Total polychlorinated biphenyls
<0.2	Sample results less than the reporting limit shown in milligrams per kilogram (mg/kg)
T	Top of concrete sample
B	Bottom of concrete sample
A	Surface to depth of 0.25 inch
B	Depth of 0.25 inch to 1.5 inches
C	Depth of 1.5 inches to 3.0 inches
D	Second slab of concrete
	PCB concentration greater than 1 mg/kg and less than 3.5 mg/kg
	PCB concentration greater than or equal to 3.5 mg/kg and less than 50 mg/kg
	PCB concentration greater than or equal to 50 mg/kg
	PCB-impacted concrete greater than 1 mg/kg
	PCB-impacted concrete greater than or equal to 3.5 mg/kg
	PCB-impacted concrete greater than or equal to 50 mg/kg
	Additional concrete locations sampled and analyzed for PCB Aroclors using EPA Method 8082 (September and October 2010)
	Concrete locations sampled and analyzed for PCB Aroclors using EPA Method 8082 and PCB Congeners using EPA Method 1668B; concrete sample collected adjacent to previous location (September 2010)

Note: Figure shall be produced in color to maintain information.

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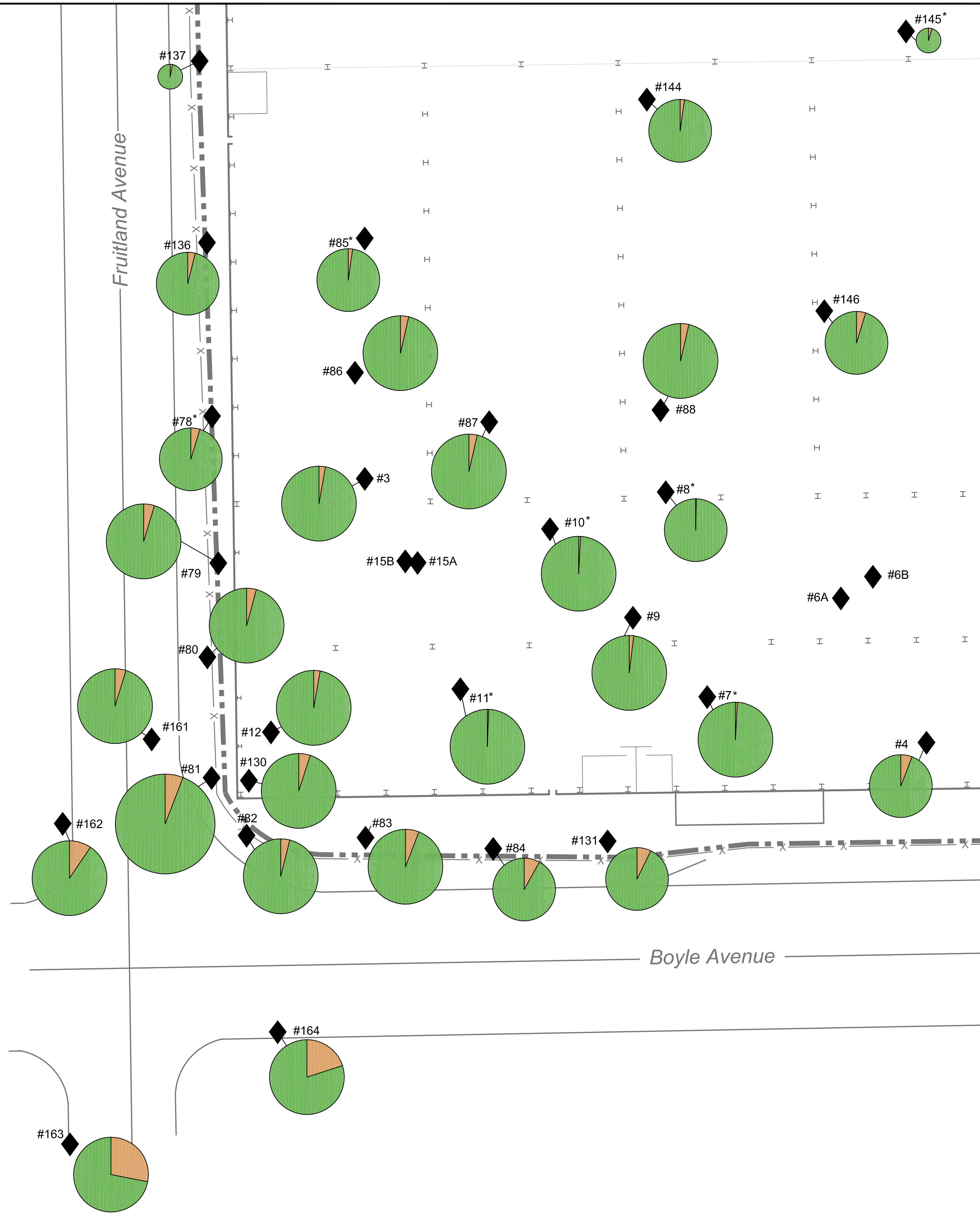
Approximate Scale in Feet

0 20 40

Basemap modified from Pechiney Cast Plate, Inc. Site Plan dated January 9, 2002; Geraghty & Miller, Inc. "Groundwater Elevation and Volatile Organic Compound Concentrations December 8, 1994" Figure dated February 2, 1995; Aluminum Company of America "Works General-MPA" Figure dated October 10, 1984; and Los Angeles County Assessor's Office Parcel Map 6310/Sheet 8 dated November 5, 1958.

CONCRETE CHARACTERIZATION SAMPLE LOCATIONS AND PCB CONCENTRATIONS
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 4



Explanation

#164 Geomatrix soil vapor sampling point

Property boundary

Total molar concentration of tetrachloroethene (PCE) and trichloroethene (TCE) in soil vapor at 5 feet below ground surface

<0.1

≥0.1 and <1.0

≥1.0 and <10

≥10

Ratio of molar concentration of PCE to TCE

#78* PCE or TCE concentration was below the detection limit; ratio calculated using 0.5 of the laboratory reporting limit

DRAFT

Approximate Scale in Feet

0 25 50

0 7.5 15

Approximate Scale in Meters

Basemap modified from Pechiney Cast Plate, Inc. Site Plan dated January 8, 2002, Geraghty & Miller, Inc. "Groundwater Elevation and Volatile Organic Compound Concentrations December 8, 1994" Figure dated February 2, 1995, Aluminum Company of America "Works General-Map" figure dated October 10, 1984, and Los Angeles County Assessor's Office Parcel Map 6310 / Sheet 8 dated November 5, 1958.

DISTRIBUTION OF PCE TO TCE
IN SOIL VAPOR AT 5 FEET
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No.10627.003
amec		Figure 5

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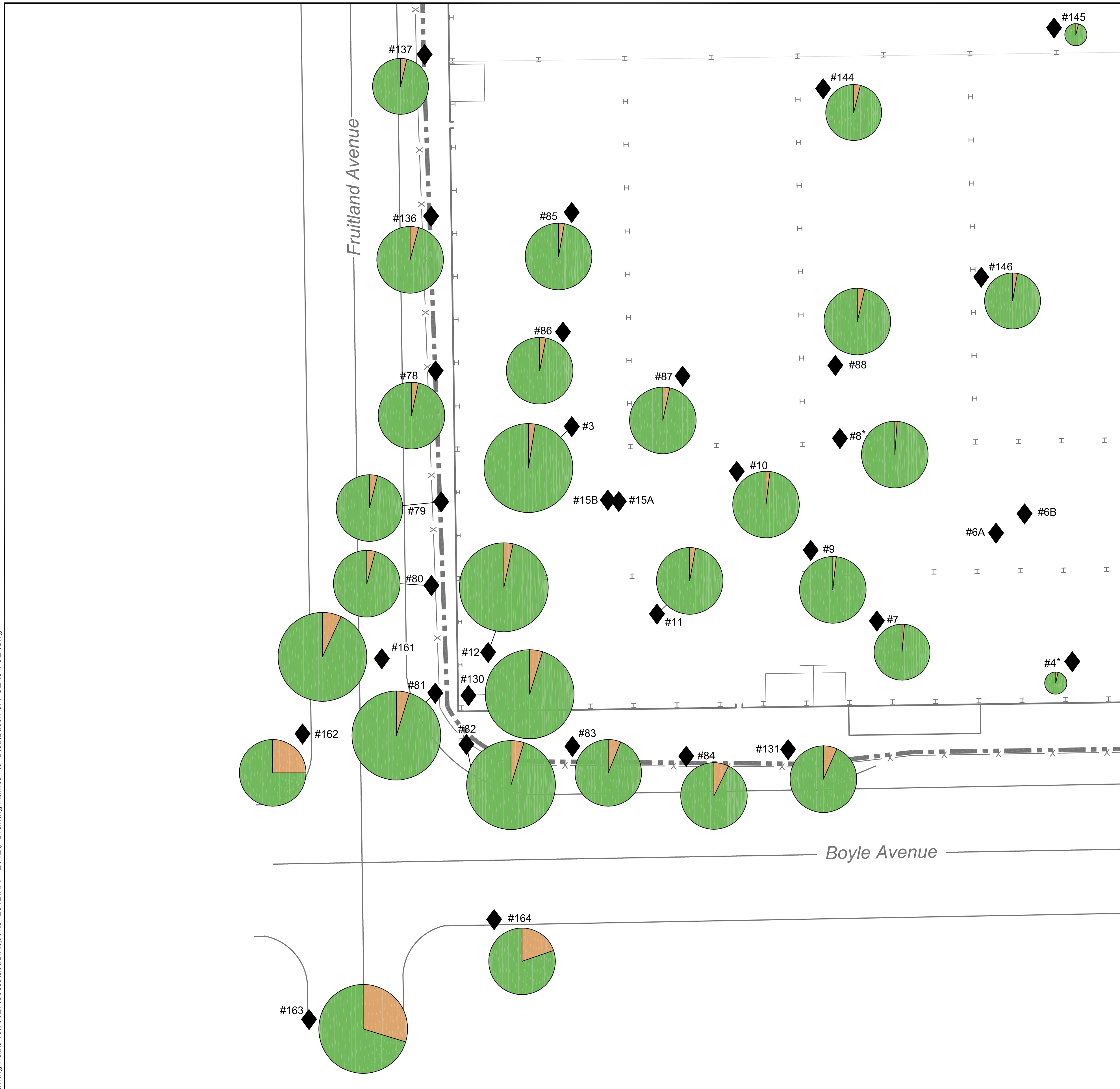

Explanation

#164 ◆ Geomatrix soil vapor sampling point

Property boundary

Total molar concentration of tetrachloroethene (PCE) and trichloroethene (TCE) in soil vapor at 15 feet below ground surface

<0.1

≥0.1 and <1.0

≥1.0 and <10

≥10

Ratio of molar concentration of PCE to TCE

#4* ◆ PCE or TCE concentration was below the detection limit; ratio calculated using 0.5 of the laboratory reporting limit

DRAFT

Approximate Scale in Feet

0 25 50

0 7.5 15

Approximate Scale in Meters

Basemap modified from Pechiney Cast Plate, Inc. Site Plan dated January 8, 2002, Geraghty & Miller, Inc. "Groundwater Elevation and Volatile Organic Compound Concentrations December 8, 1994" Figure dated February 2, 1995, Aluminum Company of America "Works General-Map" figure dated October 10, 1984, and Los Angeles County Assessor's Office Parcel Map 6310 / Sheet 8 dated November 5, 1958.

DISTRIBUTION OF PCE TO TCE
IN SOIL VAPOR AT 15 FEET
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 6

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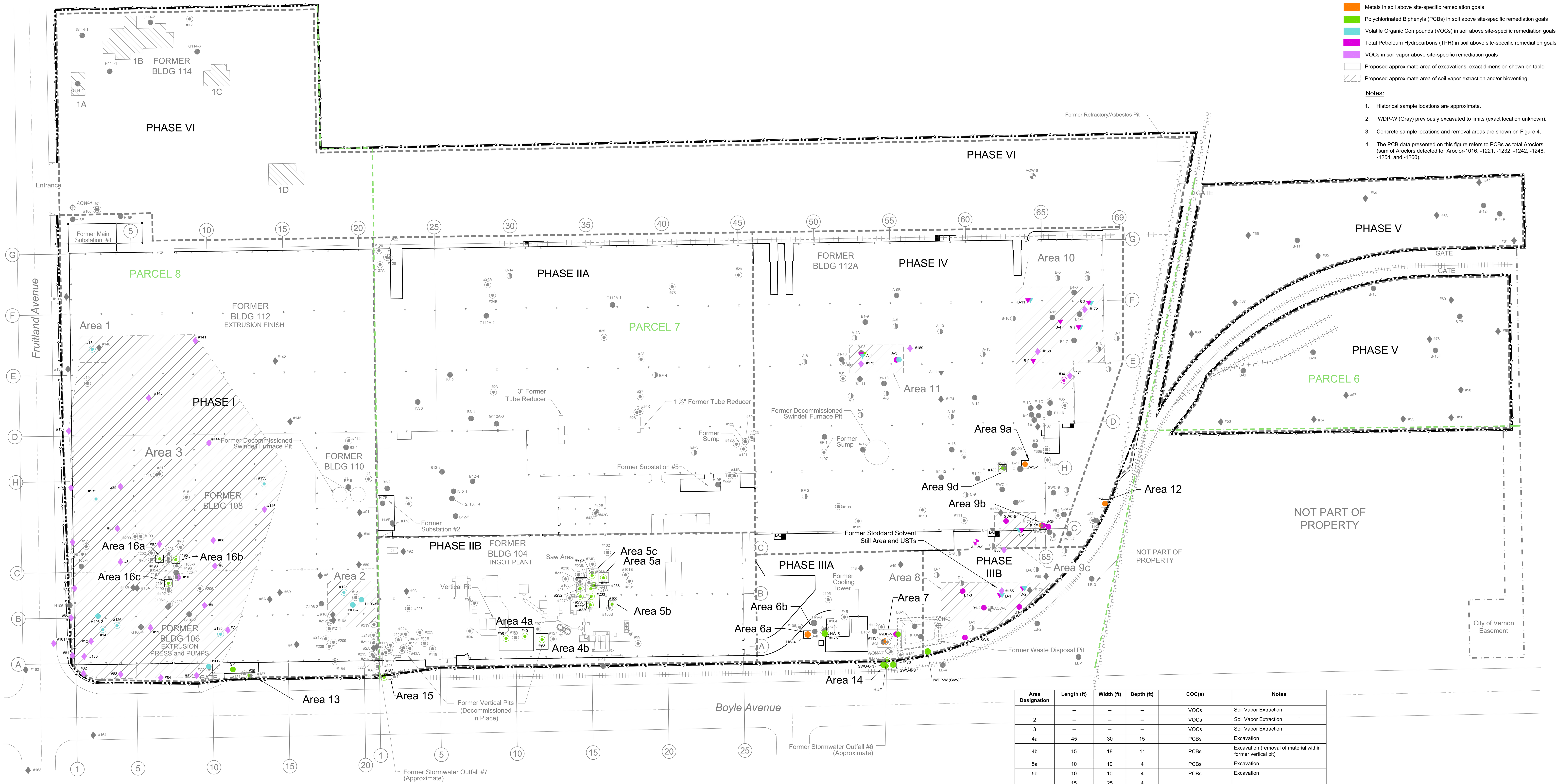

Explanation

- AOW-9 Groundwater monitoring well
- AOW-3 Groundwater monitoring well destroyed
- #90 Geomatrix and AMEC Geomatrix soil vapor sampling point
- #109 Geomatrix and AMEC Geomatrix soil boring
- B-1 Approximate location of historical boring
- D-1 Approximate location of historical CPT
- C-1 Approximate location of historical vapor extraction well (destroyed 2006)
- 20 B Column and row numbering system for footings
- Site boundary
- Phasing area boundary
- Parcel boundary
- Railroad track (at grade)
- Railroad track (buried)
- Chain link fence
- BLDG Building
- Previously decommissioned and concrete capped buried structures (1A, 1B, and 1C) with PCB impacts to remain in place in former Alcoa Building 114 (Ursic, 1999), and concrete slab (1D) in former Building 12 (Ursic, 1999) to remain in place
- Metals in soil above site-specific remediation goals
- Polychlorinated Biphenyls (PCBs) in soil above site-specific remediation goals
- Volatile Organic Compounds (VOCs) in soil above site-specific remediation goals
- Total Petroleum Hydrocarbons (TPH) in soil above site-specific remediation goals
- VOCs in soil vapor above site-specific remediation goals
- Proposed approximate area of excavations, exact dimension shown on table
- Proposed approximate area of soil vapor extraction and/or bioventing

Notes:

1. Historical sample locations are approximate.
2. IWDP-W (Gray) previously excavated to limits (exact location unknown).
3. Concrete sample locations and removal areas are shown on Figure 4.
4. The PCB data presented on this figure refers to PCBs as total Aroclors (sum of Aroclors detected for Aroclor-1016, -1221, -1232, -1242, -1248, -1254, and -1260).

Area Designation	Length (ft)	Width (ft)	Depth (ft)	COC(s)	Notes
1	--	--	--	VOCs	Soil Vapor Extraction
2	--	--	--	VOCs	Soil Vapor Extraction
3	--	--	--	VOCs	Soil Vapor Extraction
4a	45	30	15	PCBs	Excavation
4b	15	18	11	PCBs	Excavation (removal of material within former vertical pit)
5a	10	10	4	PCBs	Excavation
5b	10	10	4	PCBs	Excavation
5c	15	25	4	PCBs	Excavation
	15	55	4		
6a	15	15	8	Arsenic	Excavation
6b	25	15	4	PCBs	Excavation
7	30	25	12	PCBs, Arsenic	Excavation
8	--	--	--	Stoddard Solvent, VOCs	Soil Vapor Extraction/Bioventing
9a	5	5	2	Arsenic	Excavation
9b	5	5	2	Arsenic	Excavation
9c	--	--	--	Stoddard Solvent, VOCs	Soil Vapor Extraction/Bioventing
9d	5	5	2	PCBs	Excavation
10	--	--	--	Stoddard Solvent, VOCs	Soil Vapor Extraction/Bioventing
11	--	--	--	Stoddard Solvent, VOCs	Soil Vapor Extraction/Bioventing
12	5	5	2	Arsenic	Excavation
13	40	2	3	PCBs	Excavations (surface gravel and shallow soil)
14	10	5	5	PCBs	Excavation
15	3	3	8	PCBs	Excavation
16a	5	5	3	PCBs	Excavation
16b	5	5	3	PCBs	Excavation
16c	5	5	3	PCBs	Excavation

Notes:
COCs = Constituents of Concern.
All dimensions are approximate.

Note: Figure shall be produced in color to maintain information.

0 25 50
Approximate Scale in Feet

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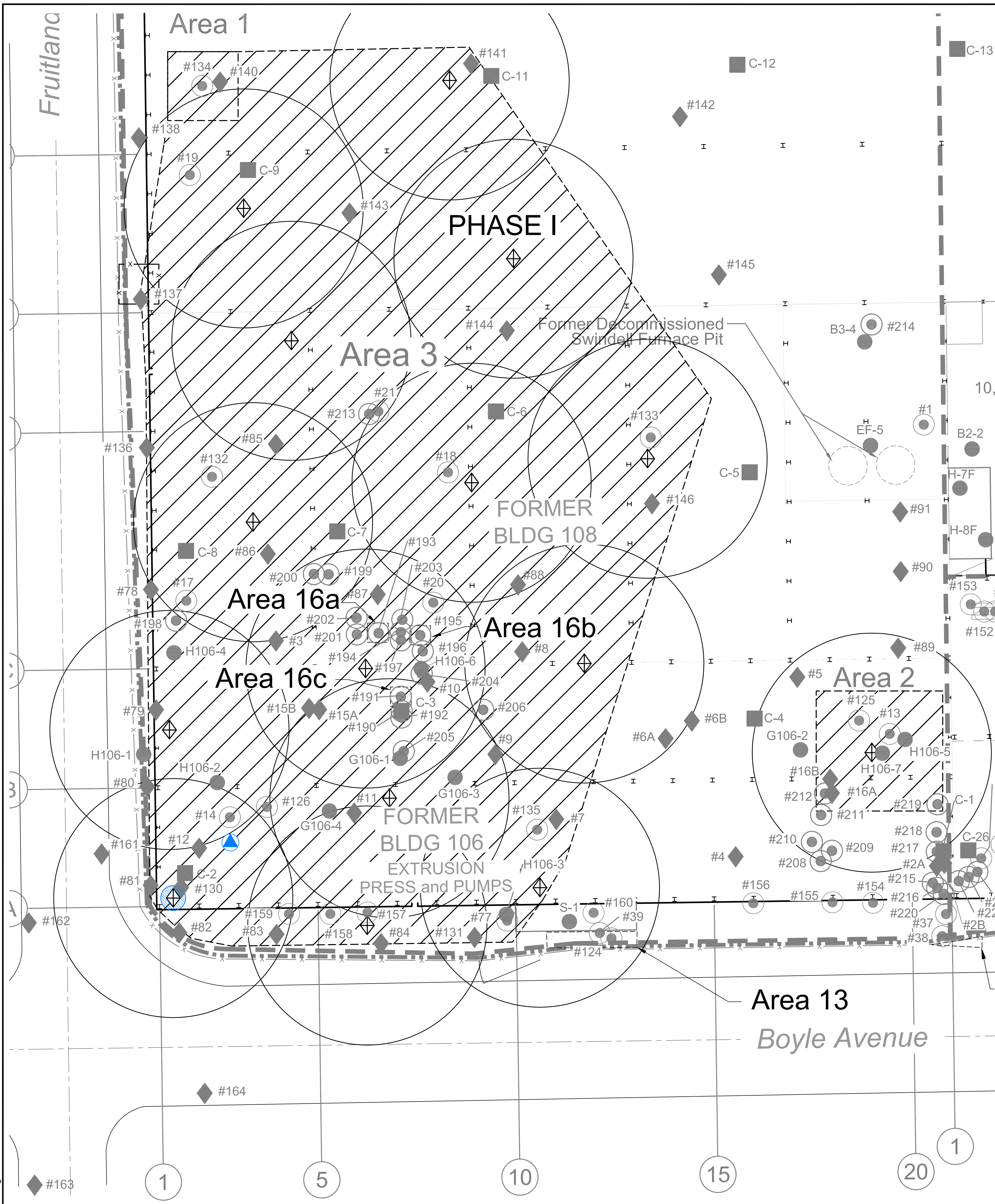
Basemap modified from Pechiney Cast Plate, Inc. Site Plan dated January 9, 2002; Geraghty & Miller, Inc. "Groundwater Elevation and Volatile Organic Compound Concentrations December 8, 1994" Figure dated February 2; 1995, Aluminum Company of America "Works General-MPA" Figure dated October 10, 1984; and Los Angeles County Assessor's Office Parcel Map 6310/Sheet 8 dated November 5, 1958.

PROPOSED SOIL REMEDIATION AREAS
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 7



Explanation

Proposed shallow soil vapor extraction well location

Proposed shallow soil vapor extraction test well location

Proposed vapor monitoring probe location (30, 60, and 90 feet bgs)

#90 Geomatrix soil vapor sampling point

#109 Geomatrix soil boring

G106-1 Approximate location of historical boring

C-30 Approximate location of historical concrete core sample

Limits of work

Proposed approximate area of soil vapor extraction

Soil vapor extraction treatment system compound

Radius of Influence 60 feet

Phasing area boundary

Chain link fence

BLDG Building

DRAFT

0 25 50

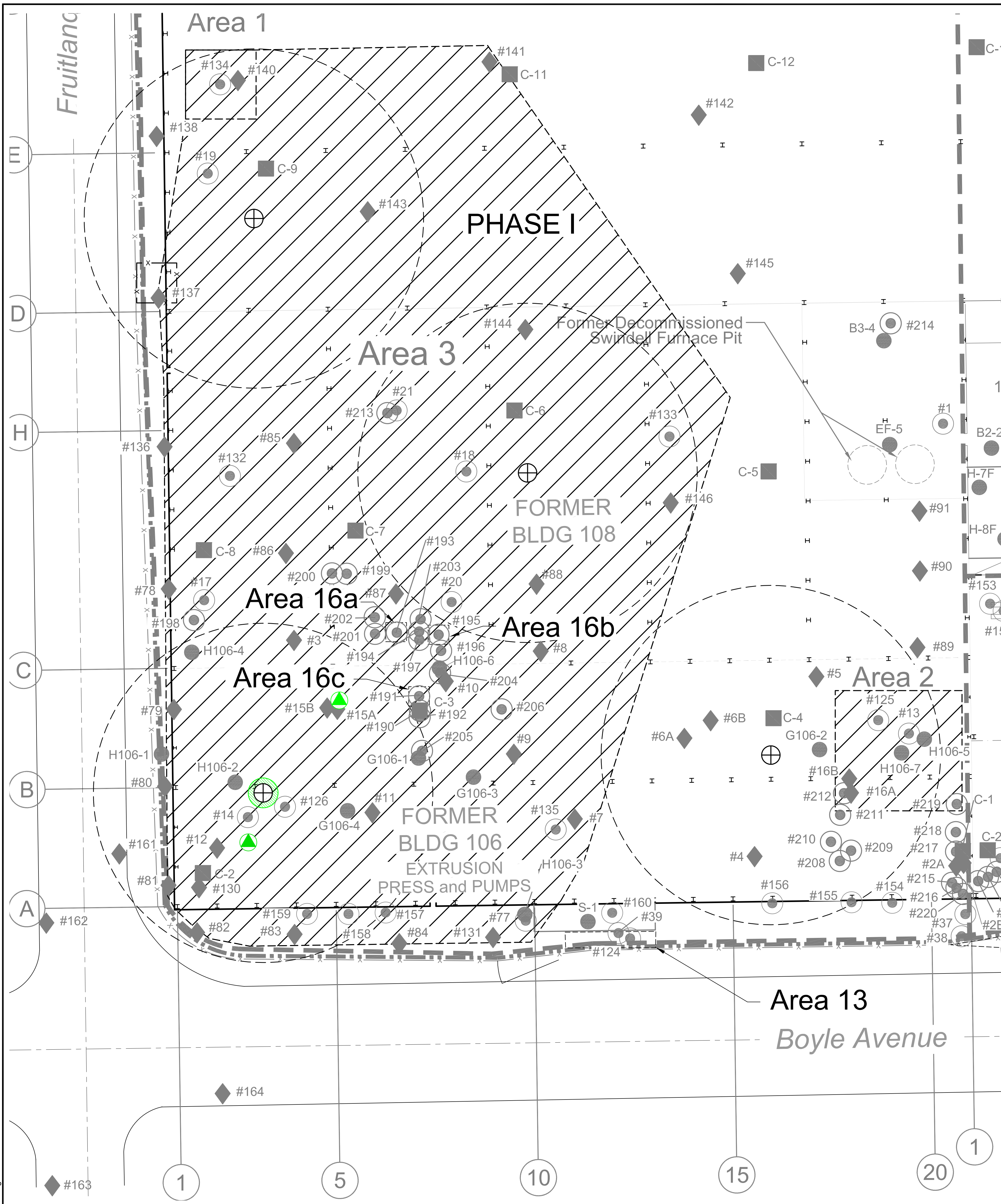
Approximate Scale in Feet

Basemap modified from Pechiney Cast Plate, Inc. Site Plan dated January 8, 2002, Geraghty & Miller, Inc. "Groundwater Elevation and Volatile Organic Compound Concentrations December 8, 1994" Figure dated February 2, 1995, Aluminum Company of America "Works General-Map" Figure dated October 10, 1984, and Los Angeles County Assessor's Office Parcel Map 6310 / Sheet 8 dated November 5, 1958.

PROPOSED SHALLOW SVE WELL LOCATIONS
PHASE I AREA
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 8

Plot Date: 05/08/12 - 5:34pm, Plotted by: pat.herring
Drawing Path: Y:\10627.003.0\acad\Reports_2012\RAP_2012\, Drawing Name: _tb_proposed SVE well locations.dwg



Explanation

- Proposed deeper soil vapor extraction well location
- Proposed deeper soil vapor extraction test well location
- Proposed vapor monitoring probe location (30, 60, and 90 feet bgs)
- #90 Geomatrix soil vapor sampling point
- #109 Geomatrix soil boring
- G106-1 Approximate location of historical boring
- C-30 Approximate location of historical concrete core sample
- Limits of work
- Proposed approximate area of soil vapor extraction
- Soil vapor extraction treatment system compound
- Radius of Influence 85 feet
- Phasing area boundary
- Chain link fence
- BLDG Building

DRAFT

0 25 50

Approximate Scale in Feet

Basemap modified from Pechiney Cast Plate, Inc. Site Plan dated January 8, 2002, Geraghty & Miller, Inc. "Groundwater Elevation and Volatile Organic Compound Concentrations December 8, 1994" Figure dated February 2, 1995, Aluminum Company of America "Works General-Map" Figure dated October 10, 1984, and Los Angeles County Assessor's Office Parcel Map 6310 / Sheet 8 dated November 5, 1958.

PROPOSED DEEP SVE WELL LOCATIONS
PHASE I AREA
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 9

Plot Date: 05/08/12 - 5:35pm, Plotted by: pat.herring
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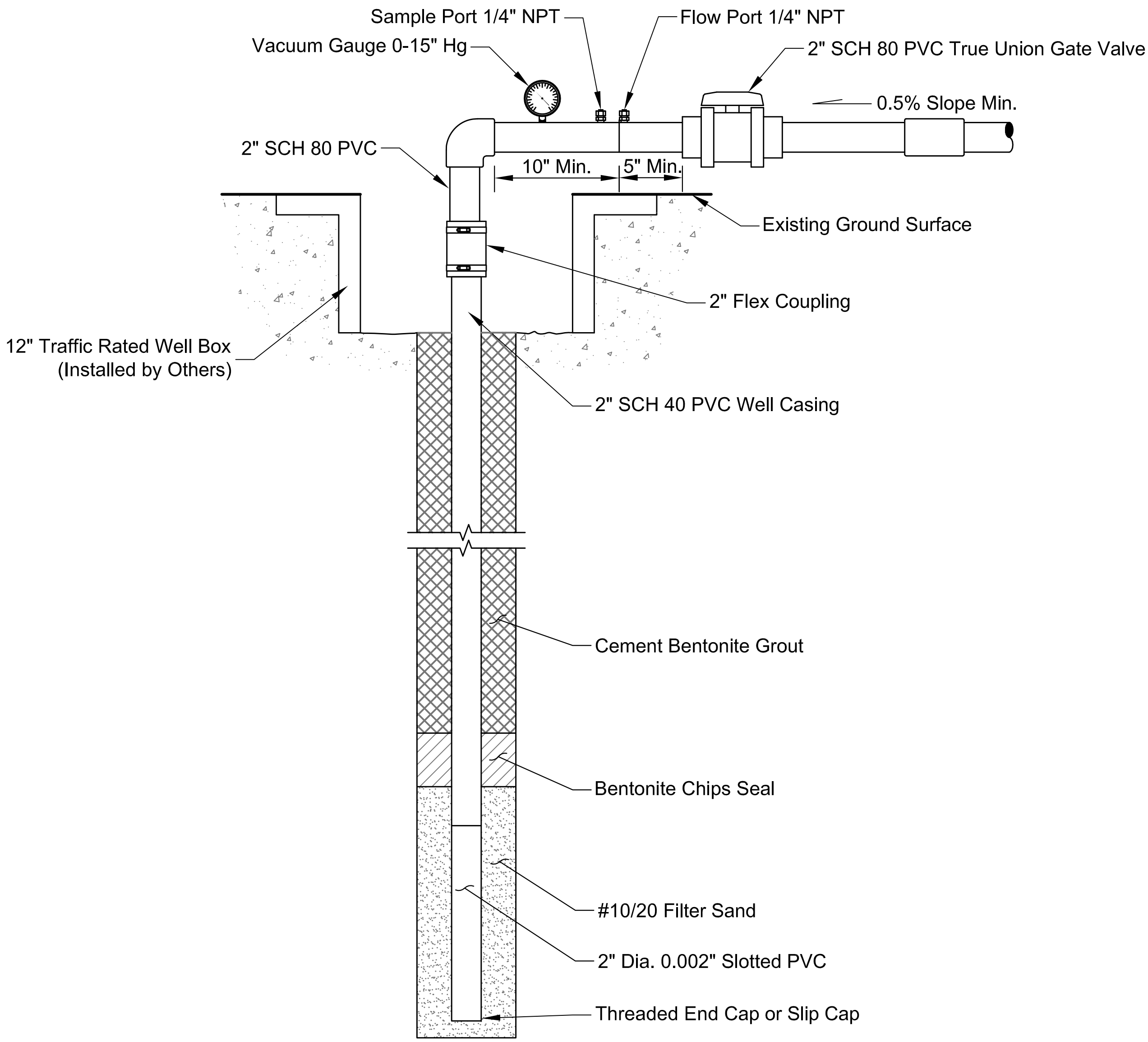

DRAFT

Not to Scale

EXTRACTION WELLHEAD AND WELL CONSTRUCTION DETAIL (SIDE VIEW) Former Pechiney Cast Plate, Inc. Facility 3200 Fruitland Avenue Vernon, California		
By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 10

Plot Date: 05/08/12 - 5:36pm, Plotted by: pat.herring
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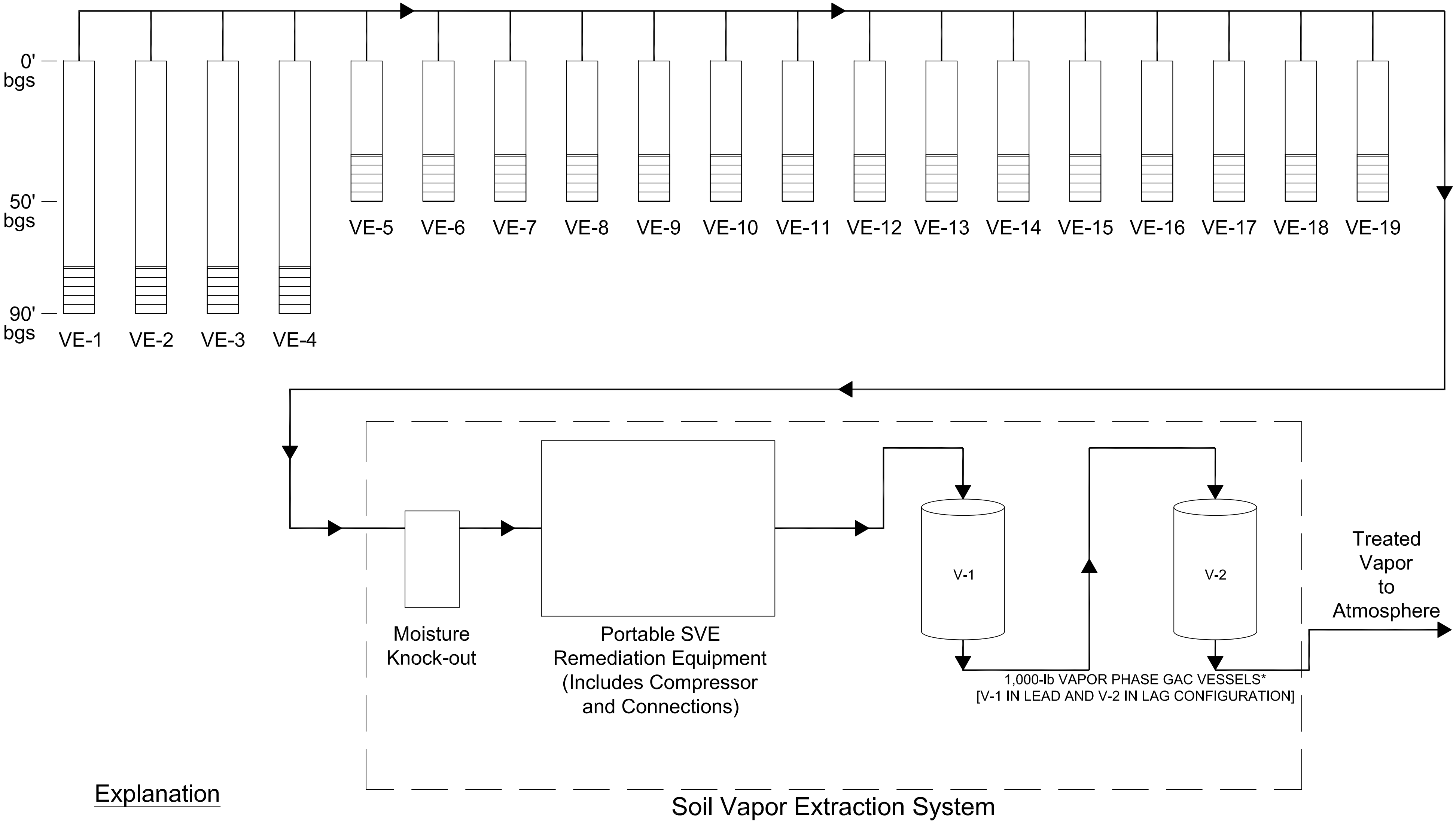

Explanation

' = feet

bgs = below ground surface

GAC = Granular Activated Carbon

* = or as specified in South Coast Air Quality Management District permit

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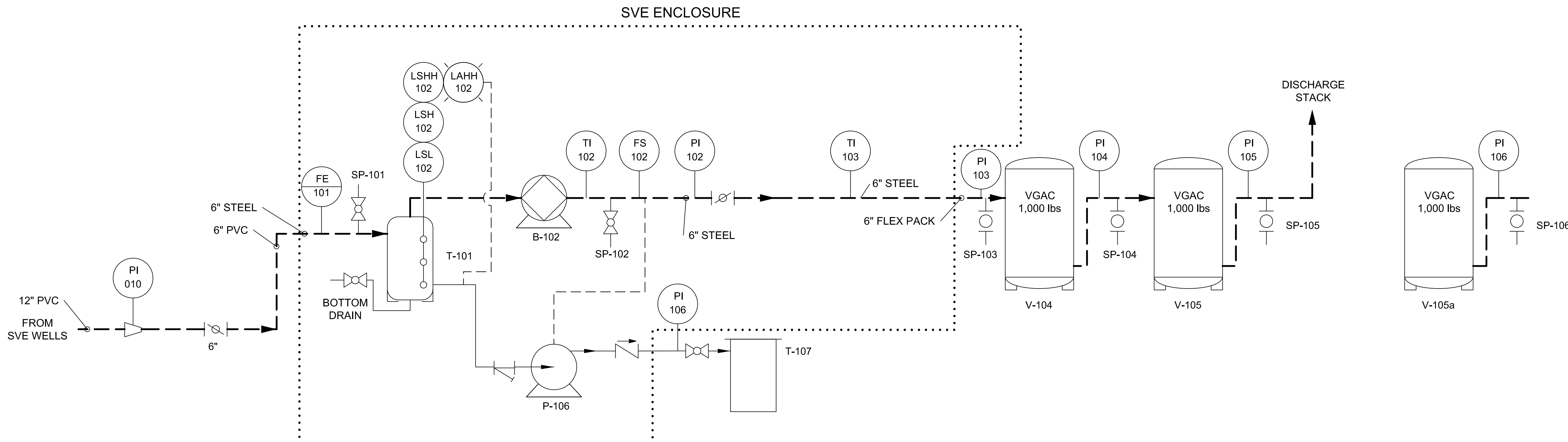
PHASE I SVE PROCESS FLOW DIAGRAM
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 11

Plot Date: 05/08/12 - 5:37pm, Plotted by: pat.herring
Drawing Path: Y:\10627.003.0\acad\Reports_2012\RAP_2012\, Drawing Name: _tb_SVE Process Flow.dwg



Abbreviations

PI	Pressure Indicator
TI	Temperature Indicator
FE	Flow Element
FS	Flow Switch
LSL	Level Switch Low
LSH	Level Switch High
LSHH	Level Switch High High
LAHH	Level Alarm High High
SP	Sample Port

Key	
T-10	Knockout tank, 60 gallon 30-inch diameter
B-102	Positive displacement blower, Gardner-Denver HF624 75hp
V-104, V-105, V-105a	Vapor phase carbon absorber, Calgon Protect VS-8 1,000 (lbs), 12" inlet/outlet
P-106	Knockout tank transfer pump, Gould NPE 1STD4D4 3/4hp TEFC NPE
PI-103, PI-104, PI-105	Pressure Gauge 0-50 in. W.C.
PI-106	Pressure Gauge, 0-60 psi
SP-103, SP-104, SP-106, SP-108	Sample Port, 1/4 turn Lab Cock Valve 1/4" PVC
PI-010	Vacuum Gauge 0-120 IU. WC.

LEGEND

- Air system line
- Water system line
- Ball valve
- Lab cock valve
- Butterfly valve
- Check valve
- Y strainer
- Flow indicator
- SVE enclosure

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PIPING AND INSTRUMENTATION DIAGRAM
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 12

Plot Date: 05/08/12 - 5:38pm, Plotted by: pat.herring
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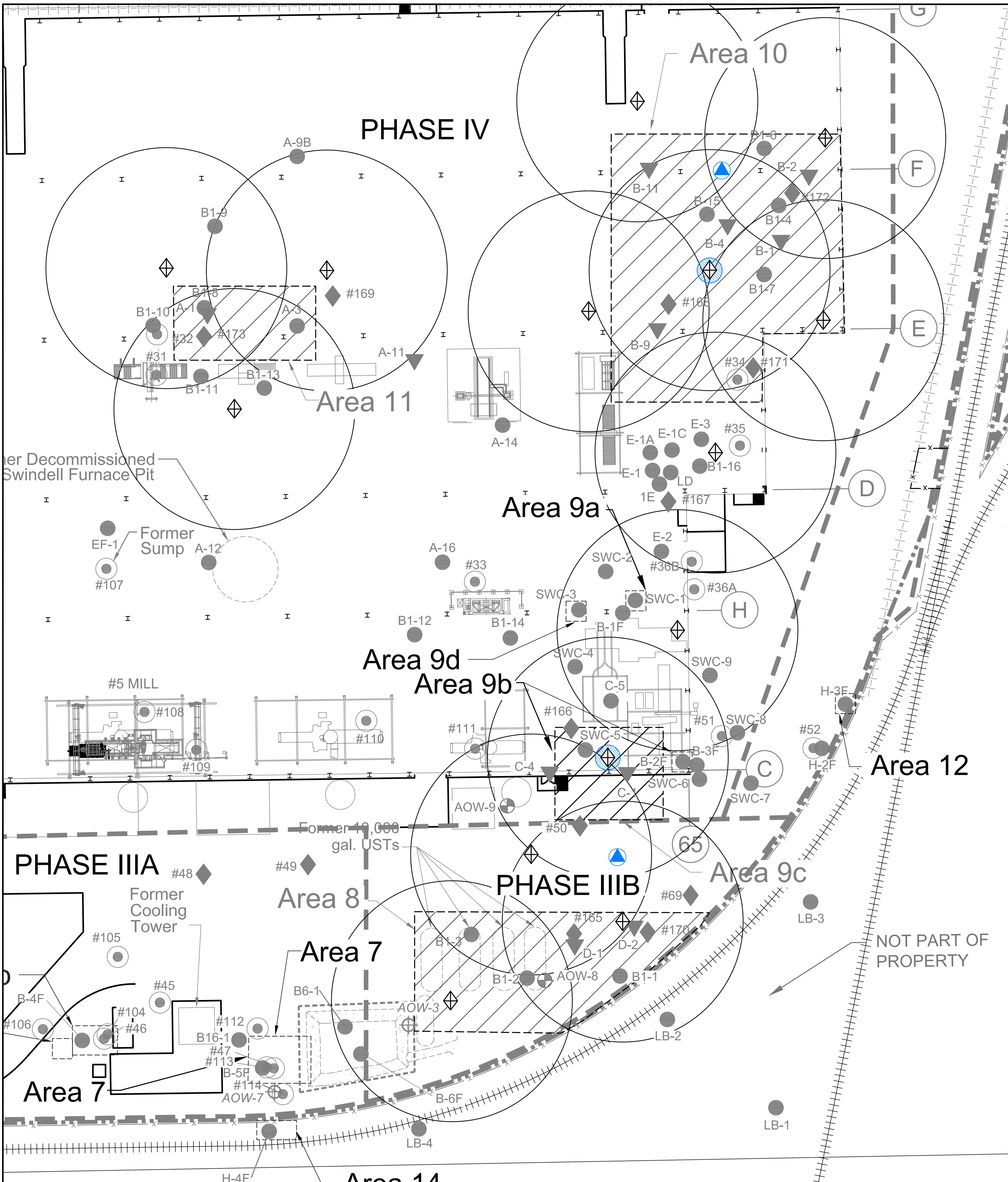

Explanation

Proposed soil vapor extraction/bioventing well location	
Proposed shallow soil vapor extraction test well location	
Proposed vapor monitoring probe location (15, 30, and 50 feet bgs)	
AOW-9	Groundwater monitoring well
AOW-3	Groundwater monitoring well destroyed
#109	Geomatrix soil boring
B-1	Approximate location of historical boring
D-1	Approximate location of historical CPT
C-1	Approximate location of historical vapor extraction well (destroyed 2006)
	Limits of work
BLDG	Building
	Proposed approximate area of soil vapor extraction
	Soil vapor extraction treatment system compound
	Radius of Influence 60 feet
	Phasing area boundary
	Railroad track (at grade)
	Chain link fence

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0 25 50
Approximate Scale in Feet

Basemap modified from Pechiney Cast Plate, Inc. Site Plan dated January 8, 2002, Geraghty & Miller, Inc. "Groundwater Elevation and Volatile Organic Compound Concentrations December 8, 1994" Figure dated February 2, 1995, Aluminum Company of America "Works General-Map" Figure dated October 10, 1984, and Los Angeles County Assessor's Office Parcel Map 6310 / Sheet 8 dated November 5, 1958.

PROPOSED SVE BIOVENTING WELL LOCATIONS
PHASE III AND IV AREAS
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 13

Plot Date: 05/08/12 - 5:35pm, Plotted by: pat.herring
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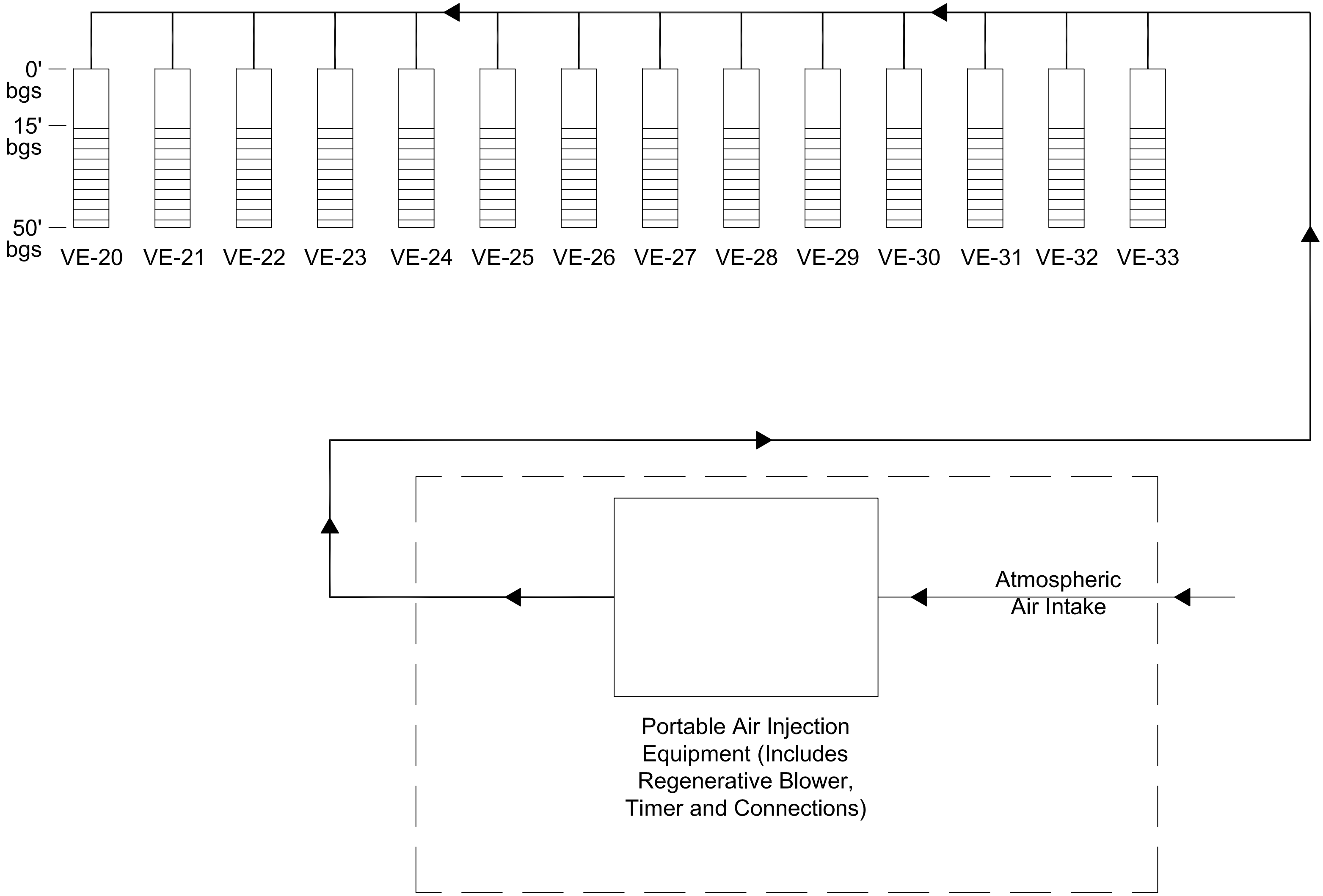

Note:

Initial SVE component of this remedy will be similar to the Process Flow Diagram shown on Figure 11.

Explanation

' = feet

bgs = below ground surface

DRAFT

PHASE III AND IV SOIL BIOVENTING
PROCESS FLOW DIAGRAM
Former Pechiney Cast Plate, Inc. Facility
3200 Fruitland Avenue
Vernon, California

By: pah	Date: 05/07/12	Project No. 10627.003
amec		Figure 14

Plot Date: 05/08/12 - 5:37pm, Plotted by: pat.herring
Drawing Path: Y:\10627.003.0\acad\Reports_2012\RAP_2012\, Drawing Name: _tb_SVE Process Flow.dwg